10-3930-625-34

TECHNICAL MANUAL

DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL

TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES, ARMY MODEL MHE 218

4,000 LBS. CAPACITY, 100 IN. LIFT

DREXEL DYNAMICS MODEL FL-40-EE-6550

FSN 3930-403-5661

4,000 LBS. CAPACITY, 180 IN. LIFT

DREXEL DYNAMICS MODEL FL-40-EE-6250

FSN 3930-403-5662

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1971

D 101.11:

READEX FICHE best copy available

WARNING

TRANSPORTING HAZARD

Failure to observe this warning may result in

SERIOUS INJURY OR DEATH

to personnel. Do not use a lifting device with a capacity of less than 10,000 pounds when lifting the forklift truck. Do now allow the truck to swing or sway while suspended. Attach lifting device to lifting eyes only.

WARNING

DANGEROUS CHEMICALS

are used in this equipment.

SERIOUS INJURY OR DEATH

may result if personnel fail to observe these safety precautions. Avoid contact with the battery electrolyte. If the solution comes in contact with the skin, rinse the area immediately with clear water to avoid skin burns. Do not smoke or use an open flame in the vicinity when servicing batteries as hydrogen gas, an explosive, is generated.

WARNING

OPERATING HAZARD

Failure to observe this warning may result in

SERIOUS INJURY OR DEATH

Do not pick up or deposit loads on slopes. When ascending or descending ramps, always travel with the load facing up the slope. Never attempt to turn or maneuver on a ramp.

WARNING

MAINTENANCE HAZARD

SERIOUS INJURY OR DEATH

to personnel may result if the forklift truck is not blocked securely before removing mast assembly, or before crawling under truck.

WARNING

UNINTENTIONAL FAST TRAVELING SPEED

may result in this equipment.
Failure to observe this warning may result in

SERIOUS INJURY OR DEATH

to personnel. The speed of the vehicle may be unintentionally affected by radio interference if the vehicle is subjected to a strong radio frequency field in the 150 to 174 megahertz range. This may occur when a radio transmitter is used within a few feet of the vehicle or when a radio transmitter is carried on the vehicle.

TM 10-3930-625-34
C2

Change
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *22 March 1973*

Direct Support and General Support Maintenance Manual TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES, ARMY MODEL MHE-218; 4000 LBS. CAPACITY, 100 IN. LIFT, DREXEL DYNAMICS MODEL FL-40-EE-6550 FSN 3930-403-5661; 4000 LBS. CAPACITY, 180 IN. LIFT, DREXEL DYNAMICS MODEL FL-40-EE-6250 FSN 3930-403-5662

TM 10-3930-625-34, 19 April 1971, is changed as follows:

Warning Page. Delete entire warning UNINTENTIONAL FAST TRAVELING SPEED.

Page i. Add LIST OF ILLUSTRATIONS as first entry in table of contents.

Page 1-1. Paragraph 1-6*b*(1), delete "series-."

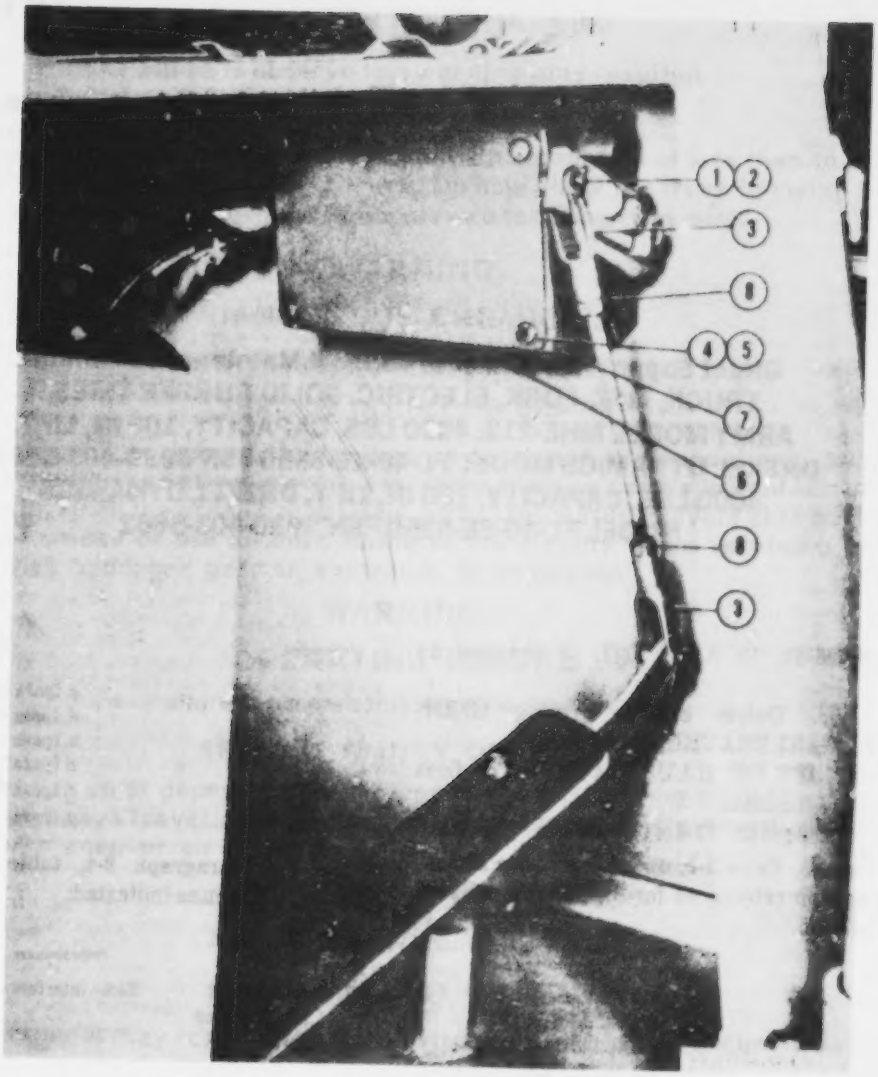
Pages 2-2 and 2-3. Table 2-1, under corrective action, change paragraph references for malfunctions listed to read as follows:

Malfunction	*Corrective action*
9	*a.* (para 7-2 through 7-6) *b.* (para 7-2 through 7-6)
12	*a.* (para 4-21 and 4-22) *b.* (para 3-25 through 3-27, or 4-2 through 4-6)
15	*c.* (para 4-15 through 4-16) *d.* (para 4-15 through 4-16) *a.* (para 7-2 through 7-6) *c.* (para 7-2 through 7-6) *d.* (para 5-8 through 5-12) *g.* (para 5-2 through 5-6)

Page 2-3. Paragraph 2-4, table 2-1, add the following to columns indicated:

Malfunction	*Probable cause*	*Corrective action*
17. Unintentional fast traveling speed.	Radio interference	Check radio components. suppression

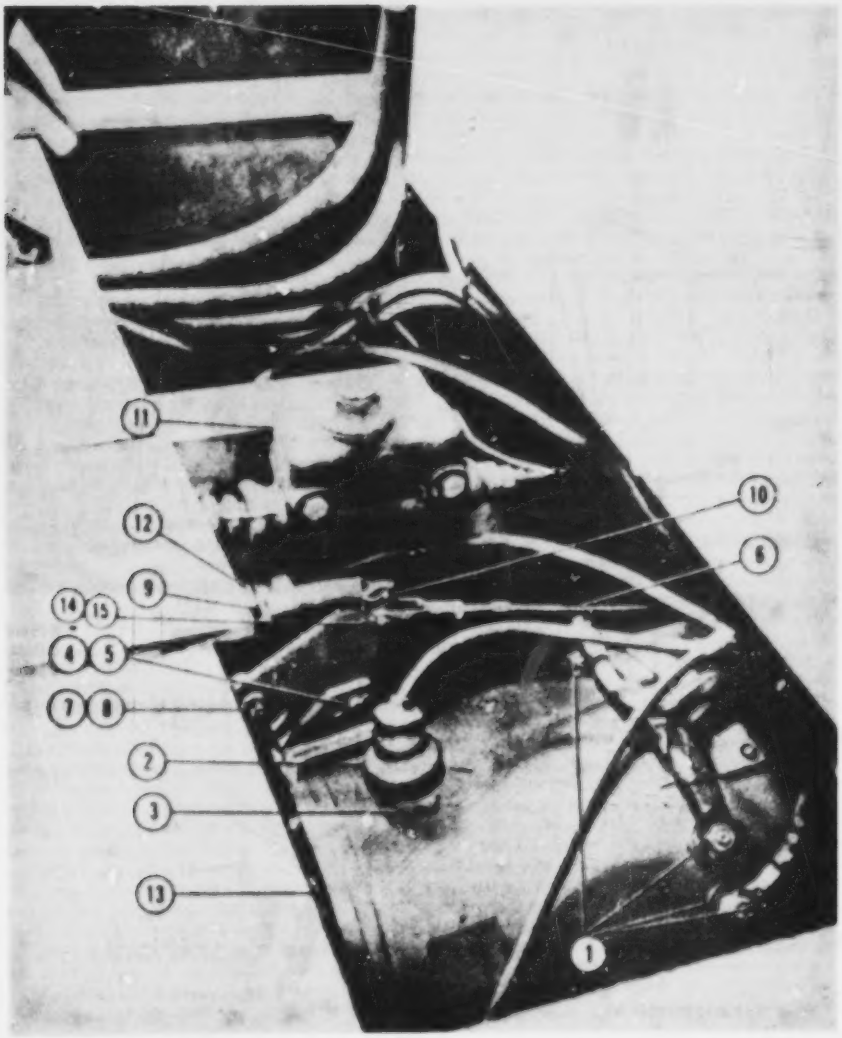
Page 2-5. **Figure 2-1 is superseded.**



1 Cotter pin (2)
2 Clevis pin (2)
3 Yoke (2)
4 Screw (4)
5 Lockwasher (4)
6 Cover
7 Accelerator control housing
8 Jamnut (2)

Figure 2-1. Accelerator control assembly.

Page 2-12. Figure 2-7 is superseded.



1 Drive motor terminals (5)
2 Rubber boot
3 Thermostat
4 Cotter pin
5 Clevis pin
6 Cable assembly
7 Cotter pin
8 Clevis pin
9 Extension spring
10 Brake crank
11 Hydraulic brake master cylinder
12 Brake switch
13 Motor support and coupling
14 Cotter pin
15 Clevis pin

Figure 2-7. Drive motor connections and seat brake crank linkage.

Page 2-16. Paragraph 2-19*a*(2), add item reference "(2)" after "clevis pin." In paragraph 1-19*a* (5), add item reference "(5)" after "coupling halves."

Paragraph 2-20*a*(2), add "housing" after "differential."

Page 2-17. Paragraph 2-22*a*(3), in line 1, change "of" to read "or;" in line 2, change "cotter pins" to read "cotter pin." Paragraph 2-22*a*(4), change "Remove the cotter pin (6)" to read "Remove two cotter pins (6)".

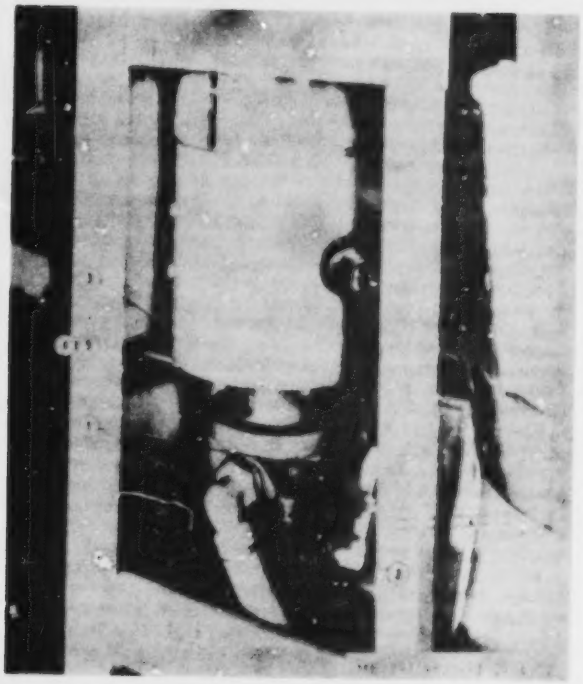
Page 2-19. Paragraph 2-24*a*(1), delete "lifting carriage."

Page 2-20. Paragraph 2-24*b*(4), delete "lifting carriage."

Page 1-21. Paragraph 2-25a(1), delete "lifting carriage."

Page 2-22. Paragraph 2-25*b*(4), delete "lifting carriage."

Figure 2-14 is superseded as follows:

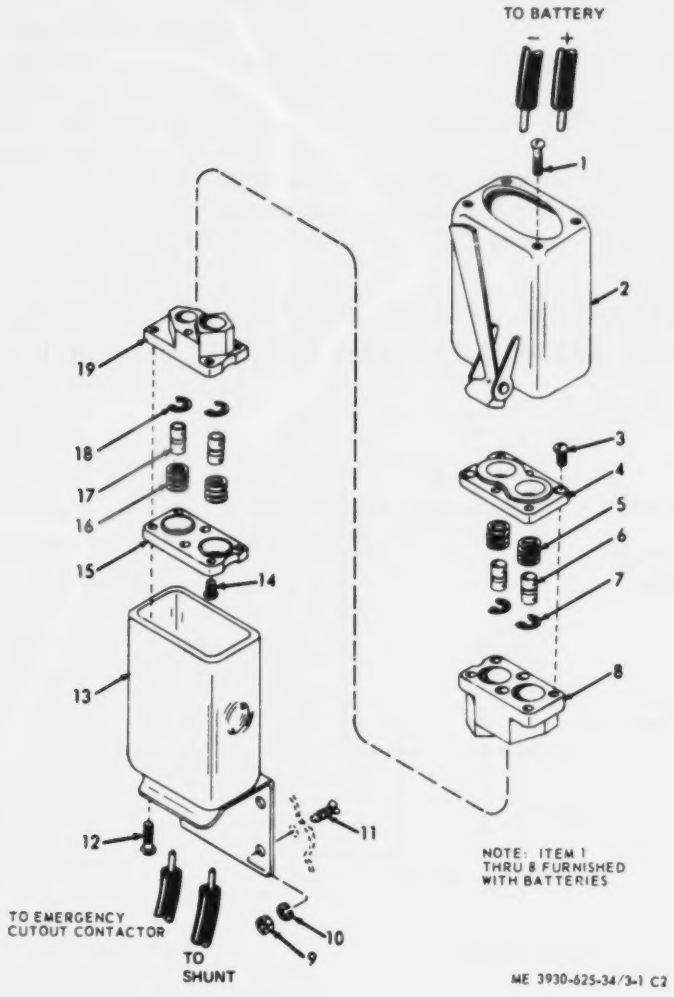


1 Hydraulic line connections to pump (2)
2 Hydraulic pump
3 Hydraulic pump motor
4 Bolt (4)
5 Lockwasher (4)

Figure 2-14. Hydraulic pump and motor.

Page 2-23. Paragraph 2-26*a*(3), change "(3)" to read "(4)."

Page 3-1. Figure 3-1 is superseded.



1 Screw
2 Connector case, locking-half
3 Screw
4 Insulation block, outer
5 Contact spring
6 Contact
7 Retaining ring
8 Contact block, inner
9 Nut (4)
10 Lockwasher (4)
11 Screw (4)
12 Screw (2)
13 Connector case, mounting-half
14 Screw (2)
15 Insulation block, lower
16 Power contact spring
17 Power contact
18 Retaining ring
19 Insulation block, upper

Figure 3-1. Battery connector, disassembly or reassembly.

Page 3-2. Paragraph 3-3*a*, change *cleaning* to read *Cleaning.*

Page 3-20. Paragraph 3-27*a*(2), change "snap ring and pin" to read "link side plate and side plate pin."

Page 3-22. Paragraph 3-27*f*(2), add "install link side plate and side plate pin."

Page 4-6. Paragraph 4-15*d*(2), change "pin assemblies" to read "pins."

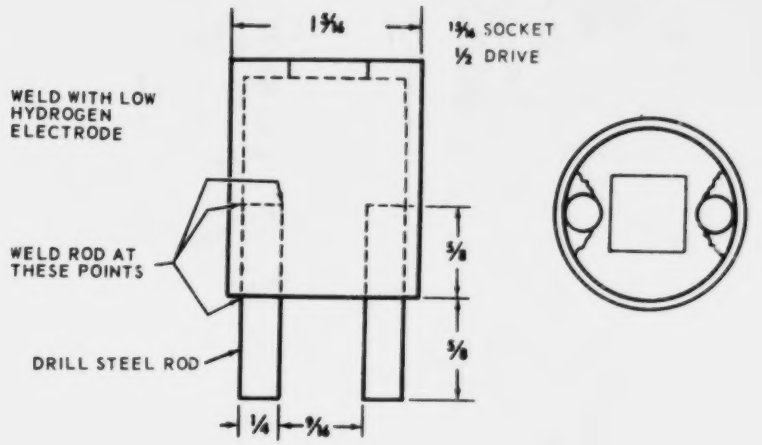
Paragraph 4-15*d*(3), change "ball bearings" to read "ball bearing idlers."

Paragraph 4-15*d*(4), in first sentence, change "roller ring," to read "roller bearings;" in second sentence, add word "outside" between "if" and "diameter." Paragraph 4-15*d*(6), in first sentence, add item number "(59)" after "pads." Paragraph 4-15*d*(7), in first sentence, add item number "(26)" after "side bearing."

Page 4-9. Paragraph 4-16*d*(5) is superseded as follows:

(5) Inspect side buttons for clearance between buttons and mast channel. If clearance exceeds 0.0625 inch, remove pipe plugs (77, fig. 4-4), and using special tool (fig 4-4.1), rotate button (78, fig. 4-4) in desired direction to obtain desired clearance, 0.032-0.0625 inch. Minimum collar thickness of button is 0.0625 inch. Replace button if smaller.

SPECIAL TOOL FOR DREXEL LIFT TRUCKS FSN 3930-403-5661 AND FSN 3930-403-5662



MANUFACTURE FROM 15/16" SOCKET, 1/2" DRIVE AND 1/4" DRILL STEEL ROD WELDED AS SHOWN

ME 3930-625-34/4-4.1 C2

Figure 4-4.1. Special wrench for adjusting mast side thrust buttons.

Page 4-10. Paragraph 4-19, *a* and *g* are superseded as follows:

a. Removal. Disconnect hydraulic line from end of flow control valve (70, fig. 4-4) at base of lift cylinder (69) and remove valve.

g. Installation. Install flow control valve (70, fig. 4-4) into base of lift cylinder (69), and connect hydraulic line to end of valve.

Page 4-16. Paragraph 4-26*b*, change second sentence to read "Inspect wiper and O-rings for deterioration."

Page 5-5. Paragraph 5-10, delete "and overhaul" from paragraph title. Paragraph 5-10*b*, (7) is added as follows:

(7) Inspect all other parts for breaks, cracks, dents, stripped threads, defective seals; etc. Replace defective parts.

Page 6-1. Key to figure 6-1, item (39) is changed to read "Roll pin (2)."

Page 6-5. Paragraph 6-14*a*(2), line 6, change "thread" to read "threads."

Paragraph 6-14*b*, line 7, change "ball joints" to read "ball and socket assemblies."

Page I-1. Add headings "Para" and "Page" above columns of paragraph and page references. Under "Adjustment:" add "Drag link . . . 2-5 2-9."

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A (qty rqr block No. 895) Direct and General Support Maintenance Requirements for Warehouse Equipment.

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. *1 October 1971*

Direct and General Support Maintenance Manual

TRUCK, LIFT FORK, ELECTRIC SOLID RUBBER TIRES
ARMY MODEL MHE218 4,000 LBS CAPACITY 100 IN. LIFT
(DREXEL DYNAMICS MODEL FL-40-EE-65501)
FSN 3930-403-5661
4000 LBS CAPACITY 180 IN. LIFT
(DREXEL DYNAMICS MODEL FL-40-EE-6250)
FSN 3930-403-5662

TM 10-3930-625-34, 19 April 1971 is changed as follows:

Throughout the manual wherever "alignment" appears, change to read "alinement". Wherever "ensure" appears, change to read "insure".

Warning Page. In line 5 of Warning, at bottom of the page, change "affected" to read "accelerated".

Page 2-2. Change item 3 in Malfunction Column to read "Maximum speed of 5.1 mph unattainable".

In item 7, line 2 in malfunction column change "radiis to read radius".

Page 2-4. Paragraph 2-9. Immediately following paragraph number and title add note as follows:

CAUTION

Disconnect the battery before working on electrical system.

Page 2-5. **Figure** 2-1 is superseded as follows:

ME 3930-625-34/2-1 C1

KEY to figure 2-1:

1 Cotter pin (2)	3 Yoke (2)	5 Lockwasher (4)	7 Accelerator control housing
2 Clevis pin (2)	4 Screw (4)	6 Cover	8 Jam nut (2)

Figure 2-1. *Accelerator control assembly, removal or installation and adjustment.*

Page 2-8. Paragraph 2-14. In line 3 of subparagraph *a* (4), change "release" to "disconnect".

Page 2-9. Paragraph 2-15. In line 1 of subparagraph *a* (4) change "release" to "disconnect".

Page 2-22. Figure 2-14 is superseded as follows:

Page 3-16. Paragraph 3-24. Delete "while direct current four pole series winding" from the third sentence.

Page 7-6. Paragraph 7-9*c* (1) is superseded as follows:

(1) Clean all parts with denatured alcohol or hydraulic brake fluid and wipe dry. If cleaning solvent is used all parts must be thoroughly rinsed in denatured alcohol or hydraulic brake fluid.

Add to paragraph *c* (4) the following:

"Inspect bore of master cylinder for scratches, rust spots and pitting. Remove minor surface defects with a brake cylinder hone.

Add paragraph *c* (6) as follows:

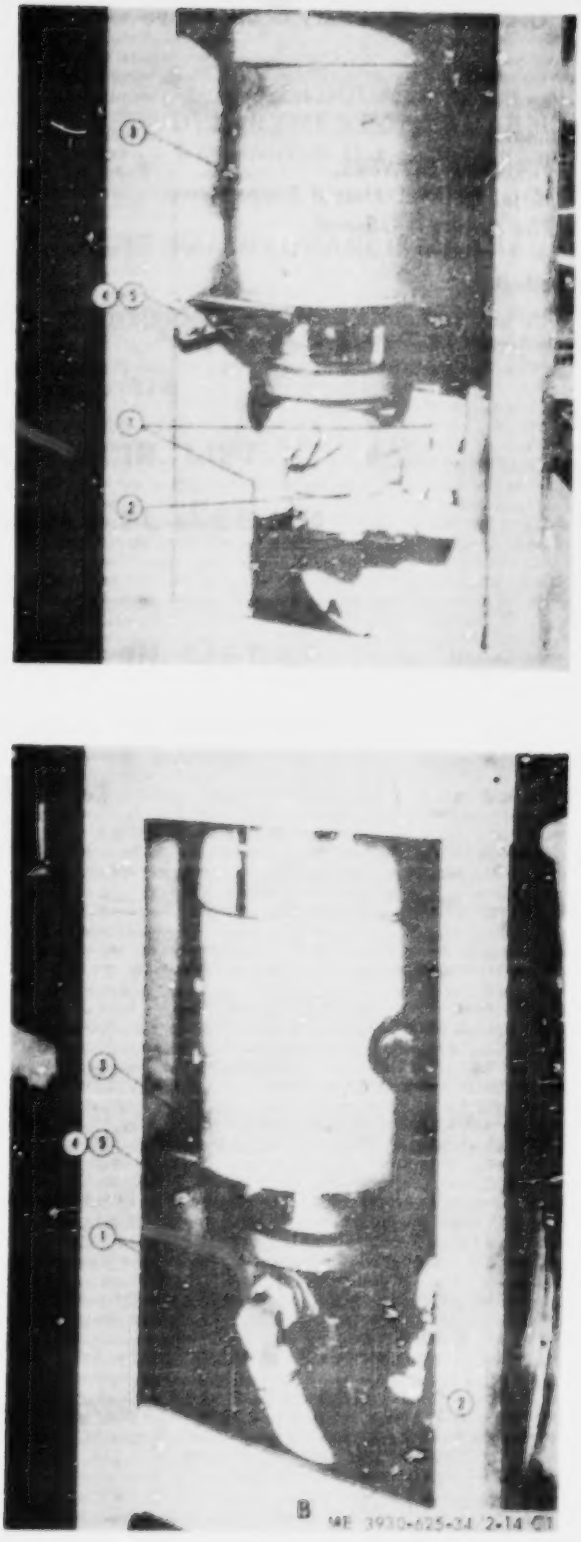
(6) Probe ports that are visible through reservoir fill-hole with fine wire to be sure they are clean. If it becomes necessary to flush the reservoir, use only pure denatured alcohol.

Page 7-9. Paragraph 7-11*c* (1) is superseded as follows:

(1) Clean metal parts in alcohol or hydraulic brake fluid. Wipe rubber parts with clean soft lint-free cloth.

Paragraph *c* (3). In line 1 change "Inspect push rods" to read "Inspect pistons and push rods".

Page A-1. Paragraph A-4. Change title of TM 38-750 to read "The Army Maintenance Management System".



KEY to figure 2-14:

1 Hydraulic line connections to pump (2)
2 Hydraulic pump
3 Hydraulic pump motor
4 Bolt (4)
5 Lockwasher (4)

Figure 2-14. Hydraulic pump and motor removal and installation.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, (qty rqr block No. 191) Direct and General Support maintenance requirements for Truck, Fork Lift, Electrical.

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *19 April 1971*

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

TRUCK, LIFT, FORK, ELECTRIC, SOLID RUBBER TIRES,

ARMY MODEL MHE 218

4,000 LBS. CAPACITY, 100 IN. LIFT

DREXEL DYNAMICS MODEL FL-40-EE-6550

FSN 3930-403-5661

4,000 LBS. CAPACITY, 180 IN. LIFT

DREXEL DYNAMICS MODEL FL-40-EE-6250

FSN 3930-403-5662

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual contains instructions for direct and general support maintenance personnel maintaining the Drexel Dynamics Models FL-40-EE-6550 and FL-40-EE-6250 Electric Forklift Trucks in accordance with the Maintenance Allocation Chart. It provides information on maintenance which is beyond the scope of the tools, equipment, personnel, or supplies normally available to the operator and organizational maintenance personnel.

1-2. Forms and Records

Maintenance forms, records, and reports to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3. Reporting of Errors

Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028, (Recommended Changes to Publications) and forwarded directly to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1-4. Description

For a complete description of the Drexel Dynamics Models FL-40-EE-6550 and FL-40-EE-6250 Electric Forklift Trucks see TM 10-3930-625-12.

1-5. Differences between Models

Model FL-40-EE-6250 forklift truck has a 180-inch mast lift and Model FL-40-EE-6550 has a 100-inch mast lift. Consequently the 180-inch mast lift has a higher powered motor and some of the component parts of the mast and carriage assemblies of the two models are different. All parts of the two models are interchangeable except the following:

a. Hydraulic pump motor.

b. Hydraulic suction hose from reservoir to pump.

c. Lift cylinder and flow control valve.

d. Complete mast assembly except the following which are interchangeable:

(1) Cylinder crosshead side block.

(2) Carriage roller assemblies.

1-6. Tabulated Data

a. Nut and Bolt Torque Data. For nut and bolt torque data see TM 10-3930-625-12.

b. Maintenance Data.

(1) *Electrical characteristics.*

Drive motor — 100 in. and 180 in. lifts.

Model 5BT1364A139
36V dc, series-series winding
Totally enclosed
Frame BT 1364
255 amps
9.48 HP at 1130 RPM
Insulation Class F as defined in NEMA standards

Hydraulic pump motor — 100 in. lift.

Model 5BT1326A92
36V dc, series winding
Totally enclosed
Frame BT 1326
150 amps
5.2 HP at 945 RPM
Insulation Class F or H as defined in NEMA standards

Hydraulic pump motor — 180 in. lift.

Model 5BT1344A54
36V dc, series winding
Totally enclosed
Frame BT 1344
182 amps
6.65 HP at 1160 RPM
Duty 20 PCTO
Insulation Class F or H as defined in NEMA standards

(2) *Mechanical characteristics.*

Drive motor — 100 in. and 180 in. lifts.

Totally enclosed — spline shaft
Armature — brazed type construction

Pump motor 100 in. lift.

Enclosure — TENV or TEFC

Face Configuration — Adaptor for SAE pump flange, type A, 2 bolt, 3/8 — 24 NF.
Shaft end — keyed only with ASA No. 45 key.
Armature — Brazed type construction
Rotation — Clockwise, viewed from shaft end

Pump motor 180 in. lift.

Enclosure — TENV or TEFC
Face Configuration — Adaptor for SAE pump flange, type A, 2 bolt, 3/8 — 24 NF.
Shaft end — keyed only with ASA No. 606 key.
Armature — Brazed type construction
Rotation — Clockwise, viewed from shaft end.

(3) *Schematic wiring diagram.* Refer to figure 1-1 for schematic wiring diagram for the forklift truck.

(4) *Electrical connection diagram.* Refer to figure 1-2 for electrical connection diagram for the forklift truck.

Figure 1-1. Electrical wiring schematic.

(Located in back of manual)

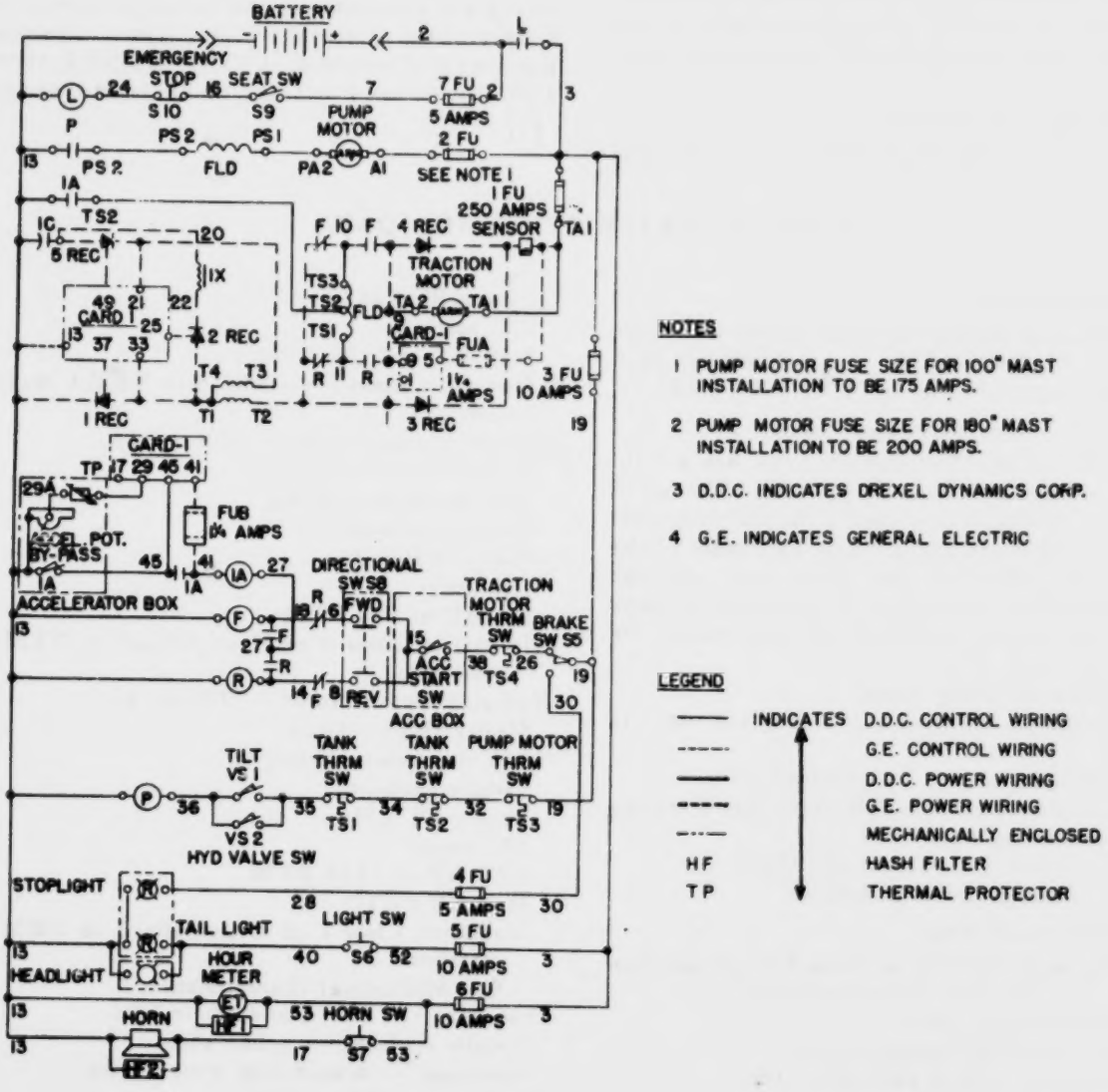


Figure 1-2. Electrical connection diagram.

CHAPTER 2

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

2-1. Tools and Equipment

Tools, equipment, and repair parts issued with or authorized for the forklift truck are listed in the Basic Issue Items List, appendix C of TM-3930-625-12

2-2. Special Tools and Equipment

No special tools or equipment are required to perform the maintenance operations described in this manual.

2-3. Maintenance Repair Parts

Direct and general support maintenance parts are listed and illustrated in TM 10-3930-625-35P.

Section II. TROUBLESHOOTING

2-4. General

Table 2-1 lists malfunctions, probable causes and corrective action(s) required by the direct and general support maintenance personnel. Each listed corrective action references the applicable maintenance instructions.

Table 2-1. Troubleshooting

Malfunction	Probable cause	Corrective action
Drive power; truck inoperative.	*a.* Battery connector defective.	*a.* Repair or replace connector (para 3-1).
	b. Motor fuse defective.	*b.* Replace fuse (TM 10-3930-625-12).
	c. Contactors do not pick up. Control voltage present from positive to negative.	*c.* Check circuit continuity (para 3-10).
	d. Contractors close. No power and no SCR hum with accelerator in SCR range.	*d.* Check points for control voltage (para 3-11*h*). Check 1 REC and 2 RFC (para 3-11*c*).
	e. Contactors close, but very little power and high-pitch SCR hum.	*e.* Check 2 REC for a short circuit (para 3-11*c*).
	f. Contactors close. Very little or no power with low SCR hum, even when accelerator is in top SCR position.	*f.* Check card 1 (para 3-11*h*). Check creep speed and top SCR speed trimpot adjustments (para 3-11*g*).
	g. Contactors close. Very little power with a normal SCR hum.	*g.* Check 3 REC for open circuit, and if found to be open, check 1, 2 and 5 REC (para 3-11*c*).
	h. Accelerator control defective.	*h.* Repair or replace accelerator control (para 3-18).
	i. Directional control switch defective.	*i.* Repair or replace directional control switch (para 3-12).
	j. SCR control defective.	*j.* Check SCR components and replace as necessary (para 3-11*c*).
	k. Line contactor defective.	*k.* Repair or replace contactor (para 3-7).
	l. F & R contactor defective.	*l.* Repair or replace contactor (para 3-8).
	m. Drive motor defective.	*m.* Repair or replace drive motor (para 3-25).
	n. Power train from motor to wheels interrupted.	*n.* Repair or replace defective parts (para 5-1).

Table 2-1. Troubleshooting — Continued

Malfunction	Probable cause	Corrective action
2. Speed: not obtainable; not controllable.	a. Accelerator switch defective.	a. Repair or replace accelerator switch (para 3-18).
	b. F & R contactors defective.	b. Repair or replace contactor (para 3-8).
	c. Drive motor defective.	c. Repair or replace drive motor (para 3-25).
3. Maximum speed unattainable.	a. 1A Timer out of adjustment.	a. Adjust timer (para 3-11c).
	b. 1A Contactor defective.	b. Repair or replace contactor (para 3-7).
	c. Drive motor defective.	c. Repair or replace drive motor (para 3-25).
4. Truck will not operate at correct creeping speed.	a. Creeping speed adjuster off.	a. Adjust creep speed (para 3-11).
	b. Card 1 defective.	b. Replace card (para 3-11)
	c. Drive motor defective.	c. Repair or replace drive motor (para 3-25).
5. Improper acceleration, lunging	a. Accelerator switch defective.	a. Repair or replace accelerator switch (para 3-18).
	b. Accelerator linkage out of adjustment.	b. Check and adjust linkage from foot pedal (para 2-10).
	c. Motor contactors defective.	c. Repair or replace contactors (para 3-7).
	d. SCR control defective.	d. Check SCR components and replace as necessary (para 3-11c).
6. Truck will not plug.	a. Plugging adjustment off.	a. Adjust (para 3-11).
	b. Card 1 defective.	b. Replace card (para 3-11).
	c. Drive motor defective.	c. Repair or replace motor (para 3-25).
7. Truck does not steer within minimum turning radius.	a. Drag link out of adjustment.	a. Adjust drag link (para 2-15).
	b. Worm gear out of adjustment.	b. Adjust worm gear (para 6-7).
	c. Tie rods out of adjustment.	c. Adjust tie rods (para 6-14).
	d. Pitman arm stops not adjusted properly.	d. Adjust stops (para 2-14).
8. Service brakes not operating properly.	a. Brake assembly defective.	a. Repair or replace brake assembly (para 7-10).
	b. Master cylinder defective.	b. Repair master cylinder (para 7-9).
9. Seat brake not operating properly.	a. Brake shoe assembly defective.	a. Repair or replace brake shoe assembly (para 7-1).
	b. Brake drum scored.	b. Repair or replace brake drum (para 7-3).
	c. Defective seat spring.	c. Replace seat spring (TM 10-3930-625-12).
10. Hydraulic pump inoperative.	a. Fuse blown.	a. Replace fuse (para 2-11).
	b. Line contractor defective.	b. Repair or replace contactor (para 3-7).
	c. Pump contactor defective.	c. Repair or replace pump contactor (para 3-9).
	d. Pump motor defective.	d. Repair or replace pump motor (para 3-26 or 3-27).
	e. Hydraulic pump defective.	e. Repair or replace pump (para 4-1).
	f. Control valve switch defective.	f. Repair or replace control valve (para 4-7).
11. Failure to lift or tilt.	a. Pump failure.	a. Refer to paragraph 10 foregoing.
	b. Directional control valve defective.	b. Repair or replace control valve (para 4-7).
	c. Lift or tilt cylinders defective.	c. Repair or replace cylinders (para 4-20 or 4-23).
	d. Flow control valve defective.	d. Repair or replace valve (para 4-17).
	e. Insufficient oil in reservoir.	e. Replenish oil (TM 10-3930-625-12).
12. Lift speed erratic.	a. Lift cylinder defective.	a. Repair or replace cylinder (para 4-20).
	b. Defective pump or motor.	b. Repair or replace pump or motor (para 3-24 or 4-1).

Table 2-1. Troubleshooting — Continued

Malfunction	Probable cause	Corrective action
12. Lift speed erratic.—Continued	*c.* Bearing pads defective.	*c.* Replace bearing pads (para 4-14).
	d. Rollers defective.	*d.* Replace rollers (para 4-14).
13. Loading: will not hold raised position.	*a.* Control valve defective.	*a.* Repair or replace control valve (para 4-7).
	b. Lift cylinder seals leaking.	*b.* Replace seals (para 4-20).
14. Mast: will not remain in back tilt position when truck is idle.	*a.* Tilt cylinder defective.	*a.* Repair or replace tilt cylinder (para 4-26).
	b. Control valve defective.	*b.* Repair or replace control valve (para 4-7).
	c. Tilt cylinder seals leaking.	*c.* Replace seals (para 4-26).
15. Drive axle noise on drive.	*a.* Loose chain coupling.	*a.* Repair or replace (para 7-1).
	b. Insufficient lubrication on chain coupling.	*b.* Lubricate (LO 10-3930-625-12).
	c. Seat brake assembly defective.	*c.* Repair or replace (para 7-1).
	d. Bevel gear set worn.	*d.* Replace gear set (para 5-10).
	e. Excessive backlash on bevel gear set.	*e.* Adjust backlash (para 5-10).
	f. Ring gear set worn.	*f.* Replace ring gear set (para 5-10).
	g. Bearings worn.	*g.* Replace bearings (para 5-4).
	h. Defective drive motor.	*h.* Repair or replace (para 3-25).
16. Overheating.	*a.* Low voltage.	*a.* Recharge batteries.
	b. Friction in drive components.	*b.* Check for proper lubrication (LO 10-3930-625-12). Replace components not operating properly.
	c. Defective mot	*c.* Repair or replace motor (para 3-24).
	d. Contactors d	*d.* Repair or replace defective contactors (para 3-6).
	e. Brakes dragg	*e.* Repair (para 7-1 and 7-10).

Section III. GENER MAINTENANCE

2-5. General

This section contains instructions or references thereto which are the responsibility of direct support and general support maintenance, and are general in nature to the forklift truck.

2-6. Cleaning

a. Use cleaning solvent (Federal Specification P-D-680) to clean or wash grease or oil from metal parts. After the parts are cleaned, rinse and dry thoroughly. Apply a light grade of oil to all polished metal surfaces to prevent rusting.

b. Avoid getting cleaning solvent or lubricants on rubber parts or electrical insulation. Clean electrical parts with a clean, dry cloth.

c. When installing new parts, remove any preservative materials such as rust preventive compound, protective grease, etc. Prepare parts as required (oil, seals, etc.); and for those parts requiring lubrication, apply the lubricant prescribed in Lubrication Order LO 10-3930-625-12.

d. Do not wash, soak, or degrease bearings having permanent shields or seals on both sides. Replace defective bearings.

2-7. Maintenance

a. General. Many repair or replacement operations can be performed without extensive disassembly of the forklift truck. Disassemble only to the extent necessary to effect the needed repair or replacement.

b. Wiring. Always tag wiring for identification prior to disconnecting.

c. Replacement Parts. Before installing new parts, inspect parts for damage during shipment or storage.

d. Gaskets, Seals and Cotter Pins. Replace all gaskets, seals and cotter pins found defective, or that were disturbed during disassembly.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND AUXILIARIES

2-8. General

This section contains procedures for the removal and installation of major units and auxiliaries. Paragraphs are arranged in the order of logical unit removal; however, the sequence given is not mandatory. Major units and auxiliaries may be removed in any order desired.

2-9. Replacement of Wiring (fig. 1-2)

Most wires in the forklift truck, whether run individually or in a harness, are marked or numbered. The majority of the electrical leads have crimp-on connections at each end; some of the components have quick disconnect type connectors on the wire leads. Tag each wiring terminal prior to disconnecting. Disconnect terminals, remove straps and lift wiring from chassis. Inspect chassis wireways and remove any sharp edges, burrs and fins which may cause the abrasion of insulation. Where wires are carried through openings in metal walls, ensure that the edges of the openings are rounded or are provided with bushings. Inspect replacement wiring for damage sustained during shipment or storage. Replace disfigured straps or damaged securing screws. Strap replacement cable to chassis and connect terminals, checking with markings of wires on replaced cable, if necessary. Be sure that all wiring connections are tight.

2-10. Accelerator Control Assembly, Removal, Installation and Adjustment

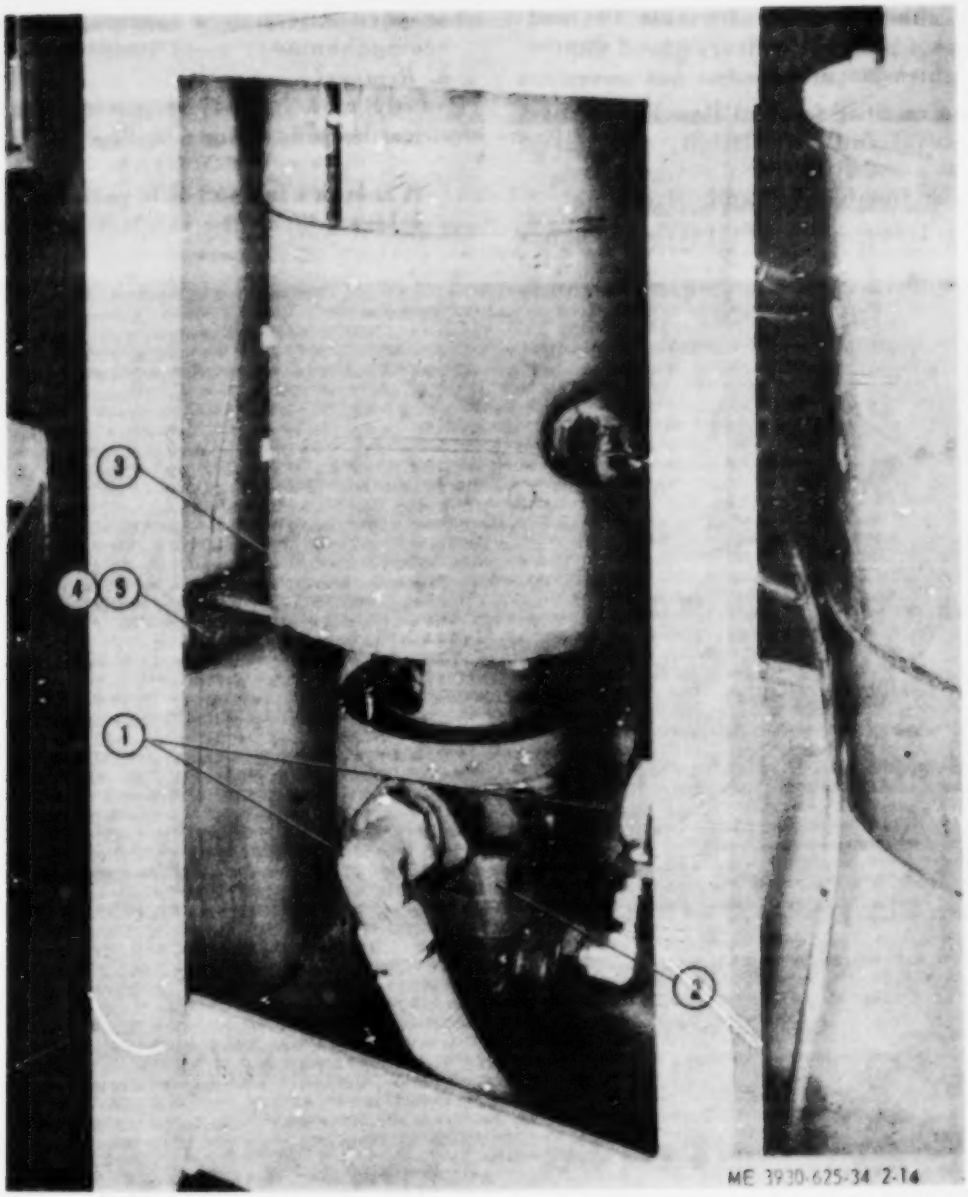
a. Removal.

(1) Disconnect the accelerator linkage by removing cotter pin (1, fig. 2-1) and clevis pin (2) and release yoke (3).

(2) Remove four screws (4) and lockwashers (5) and lift cover (6) from accelerator control assembly housing (7).

(3) Tag and disconnect electrical leads.

(4) From the front of the console remove four screws and lockwashers which attach the housing (7) to the console. Lift off the housing.



1. Cotter pin (2)
2. Clevis pin (2)
3. Yoke (2 reqd)
4. Screw (4)
5. Lockwasher (4)
6. Cover
7. Accelerator control housing
8. Jam nut (2)

Figure 2-1. Accelerator control assembly, removal or installation and adjustment.

b. Installation.

(1) Position accelerator control housing (7) and secure in place with four screws and lockwashers threaded into the housing from the front of the console.

(2) Connect the electrical leads.

(3) Install cover (6) with four screws (4) and lockwashers (5).

(4) Connect the upper yoke (3) to the accelerator control by means of the clevis pin (2) and cotter pin (1).

c. Adjustment. Adjust the accelerator linkage

by loosening either or both jam nuts (8) and rotating adjacent yoke (3) to lengthen or shorten linkage. Retighten jam nuts.

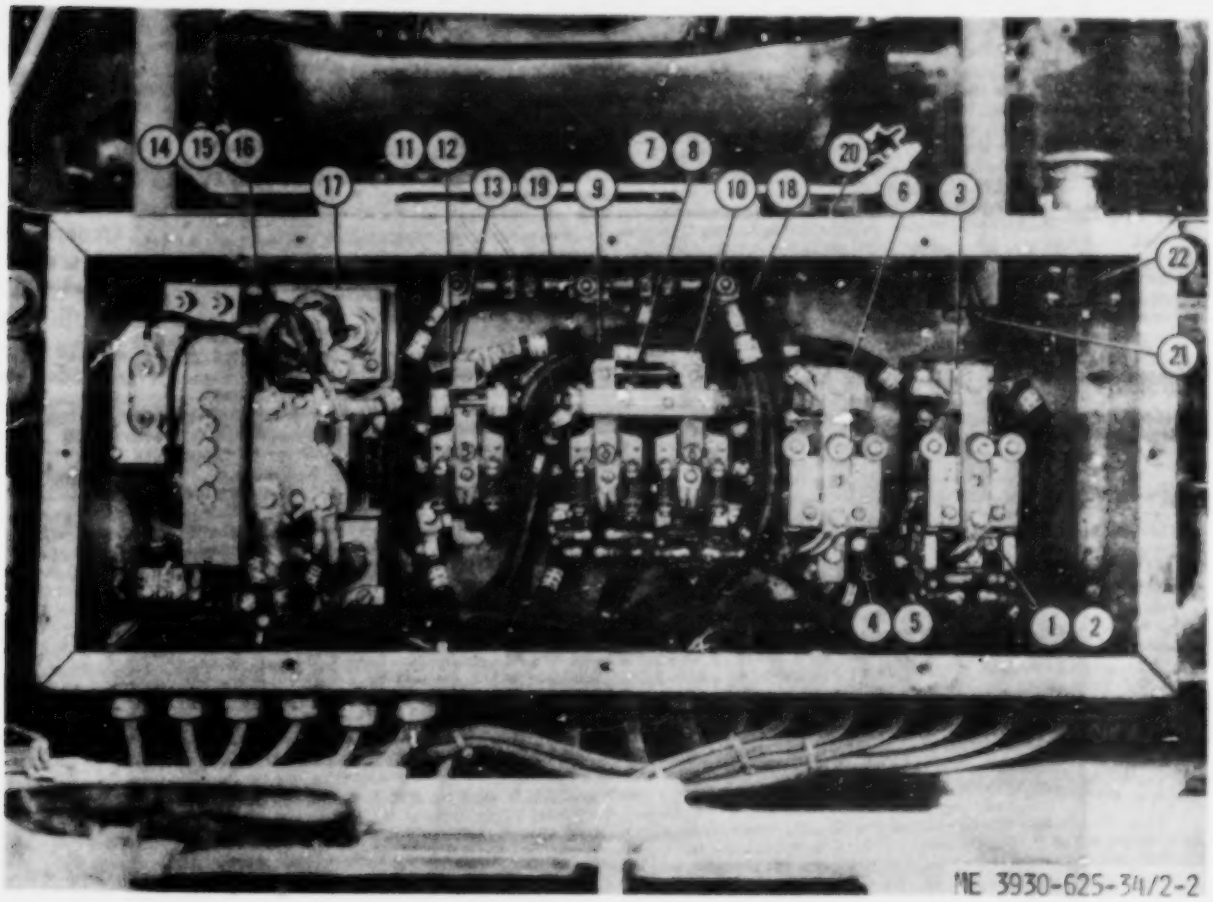
c. Contactors, SCR Control Panel and Fuse Holder, Removal and Installation

CAUTION

Disconnect the battery and discharge capacitor 1C before touching electrical components.

a. Removal.

(1) Remove control box cover and disconnect electrical leads as necessary (fig. 2-2).



1. Capscrew (4)
2. Lockwasher (4)
3. 1A Contactor
4. Capscrew (ref item 1)
5. Lockwasher (ref item 2)
6. L Contactor
7. Pan head screw (6)
8. Lockwasher (6)
9. F Contactor
10. R Contactor
11. Pan head screw (ref item 7)
12. Lockwasher (ref item 8)
13. P Contactor
14. Capscrew (3)
15. Flat washer (3)
16. Lockwasher (3)
17. SCR Control panel
18. Flat head screw (2)
19. Fuse block
20. Seat switch
21. Elapsed time meter
22. Emergency switch

Figure 2-2. Contactors, SCR control panel and fuse holder, removal or installation.

(2) Remove two capscrews (1) and two lockwashers (2) and lift out the 1A contactor (3).

(3) Remove two capscrews (4) and two lockwashers (5) and lift out the L contactor (6).

(4) Remove four pan head screws (7) and four lockwashers (8) and lift out the F and R contactors (9) and (10).

(5) Remove two pan head screws (11) and lockwashers (12) and lift out the P contactor (13).

(6) Remove three capscrews (14), three flat washers (15) and three lockwashers (16) and lift out the SCR control panel (17).

(7) Loosen nuts securing fuses, and remove

fuses. Remove two flat head screws (18) and remove the fuse holder block (19).

b. Installation.

(1) Install in the reverse order of removal (refer to sub paragraph *a* preceeding).

CAUTION

When installing SCR Control Panel (17) coat mating surfaces with heat-transfer grease.

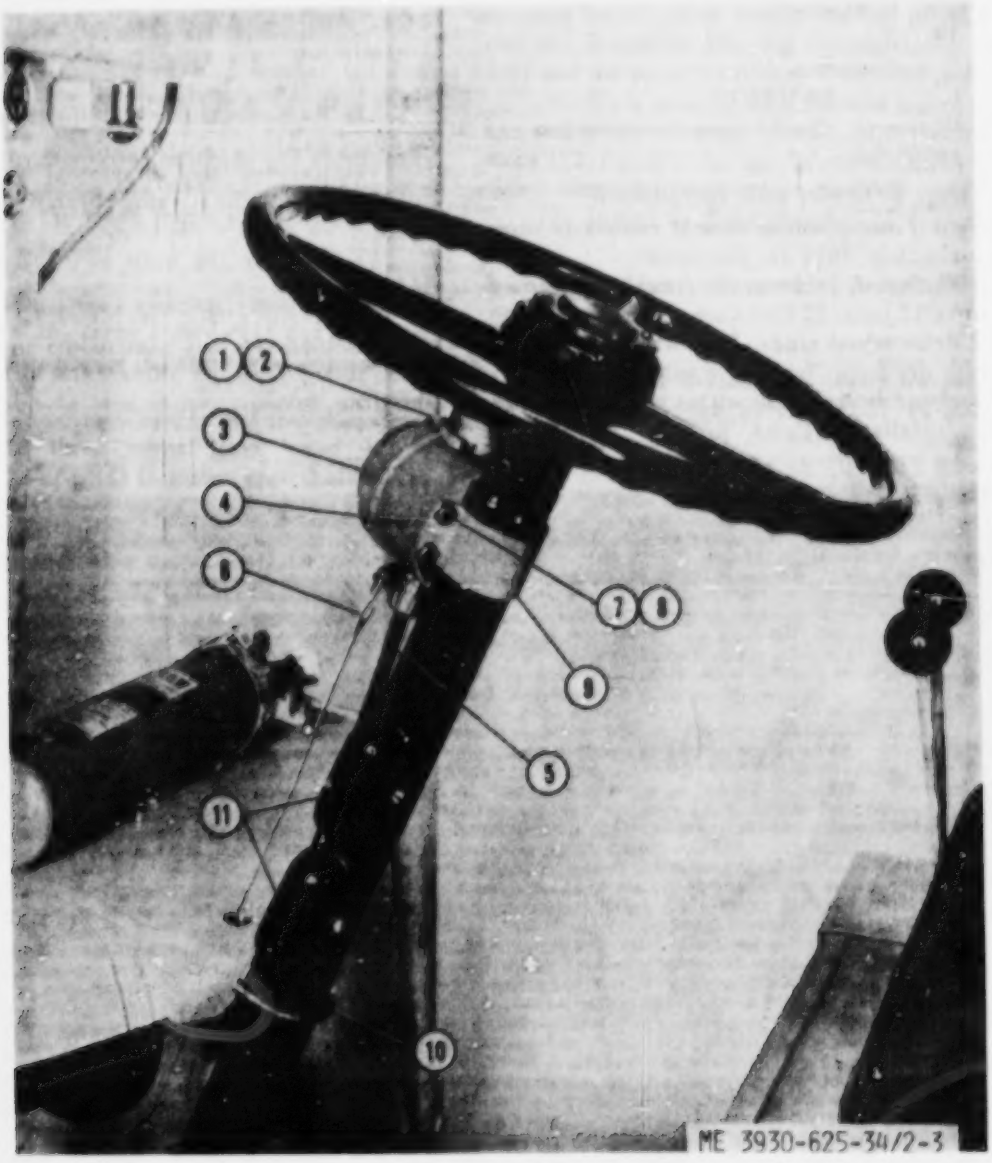
(2) Connect the electrical leads.

(3) Install cover on electrical control box with six screws and lockwashers.

2-12. Directional Control Switch, Removal and Installation (fig. 2-3)

a. Removal.

(1) Remove two screws (1) and washers (2), and lift off cover (3) from directional control switch (4).



1. Screw (2)
2. Washer (2)
3. Cover
4. Directional control switch
5. Electrical lead
6. Self-centering linkage
7. Cap screw (4)
8. Washer (4)
9. Clamp, directional control switch
10. Clamp, steering column
11. Horn connection assembly (2)

Figure 2-3. Directional control switch, removal or installation.

(2) Disconnect electrical leads (5) and self-centering linkage (6).

(3) Remove four cap screws (7) and four washers (8) from directional control switch clamp (9) and lift the directional control switch (4) from its mounting on the steering column.

b. Installation.

(1) Mount the directional control switch (4) in place on the steering column and secure with the clamp (9) and four cap screws (7) and washers (8).

(2) Connect the electrical leads (5) and the self-centering linkage (6).

(3) Install cover (3) and secure it by two screws (1) and washers (2).

CAUTION

Install tire on wheel in same position as one removed.

2-13. Tires, Removal and Installation

a. Front Tires. Replace tires if rubber is worn to approximately 16½ in. diameter.

(1) *Removal.* Jack up the front of the truck and remove 12 nuts, 12 lockwashers and six dowels from 12 drive wheel studs. Pull wheel and brake drum with tire from final drive gear. Remove tire from wheel and brake drum with a hydraulic press.

(2) *Installation.* Press tire on wheel and brake drum with a hydraulic press. Position wheel over 12 studs on final drive gear and secure in place with six dowels and 12 lockwashers and nuts.

b. Rear Tires. Replace tires if rubber is worn to approximately 12 inch diameter.

(1) *Removal.* Jack up the rear of the truck. Remove six wheel bolts and pull off wheel. Remove tire from wheel with a hydraulic press.

(2) *Installation.* Press tire on wheel with a hydraulic press. Position wheel on hub and secure in place with six wheel bolts.

2-14. Steering Gear Assembly, Removal and Installation

a. Removal.

(1) Remove the front left floor plates (TM 10-3930-625-12).

(2) Remove the directional control switch (para 2-12) and the steering column clamp (10, fig. 2-3).

(3) Remove the horn connection assemblies (11, fig. 2-3).

(4) Remove the cotter pin (1, fig. 2-4) and nut (2) attaching the ball joint of the steering linkage (drag link) (3) to the pitman arm (4), and release the drag link.

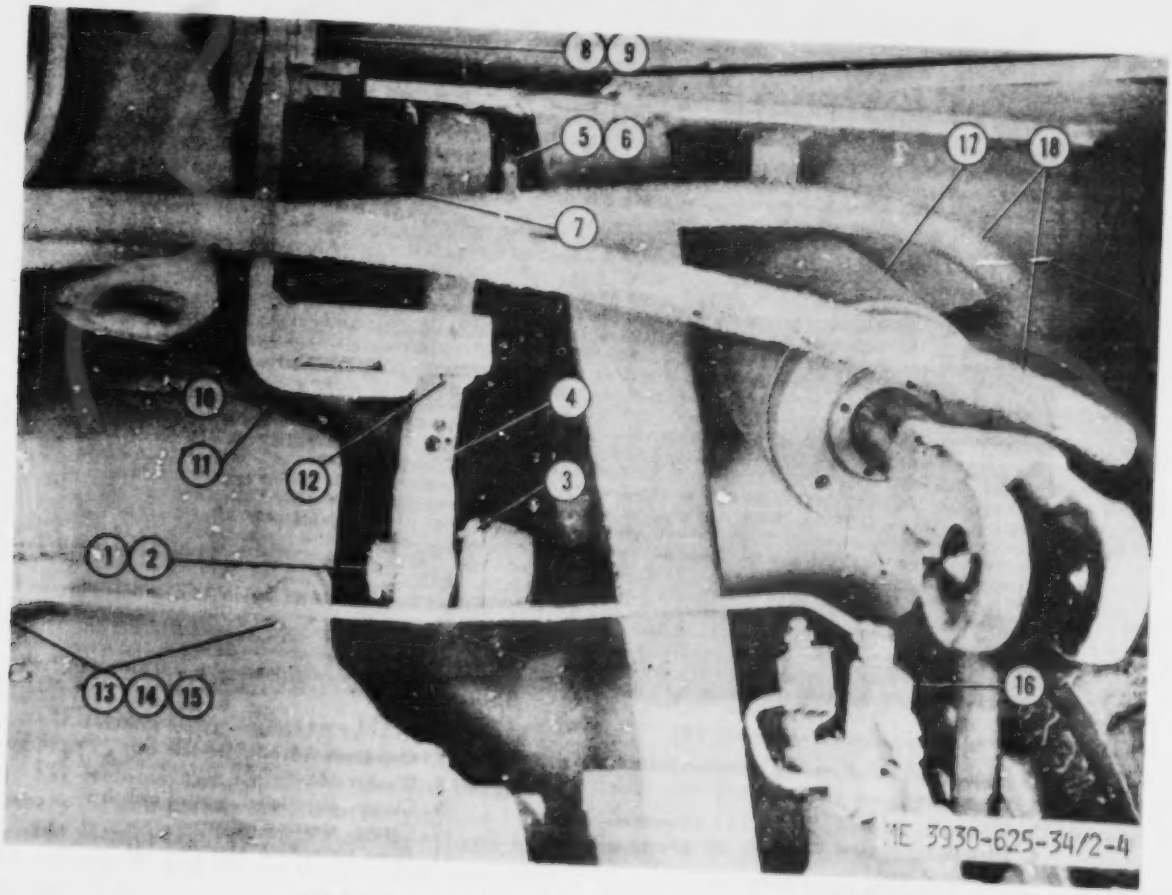


Figure 2-4. Steering gear assembly, removal or installation.

KEY to fig. 2-4:

1. Cotter pin
2. Nut
3. Drag link assembly
4. Pitman arm
5. Nut
6. Washer
7. Sector gear shaft
8. Bolt (3)
9. Lockwasher (3)
10. Steering gear assy housing
11. Frame
12. Pitman arm stops
13. Bolt (2)
14. Lockwasher (2)
15. Nut (2)
16. Hydraulic brake connection
17. Tilt cylinder (2)
18. Hydraulic lines (4)

NOTE

Match mark pitman arm and sector gear shaft to facilitate proper positioning during re-assembly.

(5) Remove the nut (5) and washer (6) and pull the pitman arm (4) from the sector gear shaft (7).

(6) Remove the three bolts (8) and three lockwashers (9) attaching the steering gear assembly housing (10) to the truck frame (11). Remove the steering gear assembly.

b. Installation.

(1) Position the steering gear assembly housing (10) to the truck frame (11) and secure it in place with three bolts (8) and three lockwashers (9).

(2) Place steering wheel in mid-travel position (approximately three turns from dead stop). Position pitman arm (4) to sector gear shaft (7) at an angle of 23½° to the center line of the steering column and secure in place with washer (6) and nut (5) torqued 100 to 125 foot-pounds.

(3) Connect the drag link (3) to the pitman arm (4) with nut (2) and cotter pin (1).

(4) Install the horn button connection assemblies (11, fig. 2-3).

CAUTION

When installing steering column clamp, take care that directional control switch and horn button cables are not pinched.

(5) Install the steering column clamp (10, fig. 2-3) and the directional control switch (para 2-12).

(6) With steering wheel in mid travel position and rear wheels straight a head, adjust pitman arm stops (12, fig. 2-4) for approximately three turns in either direction from center position.

(7) Install the floor plates (TM 10-3930-625-12).

2-15. Draglink, Removal, Installation and Adjustment

a. Removal.

(1) Raise forks approximately 52 inches.

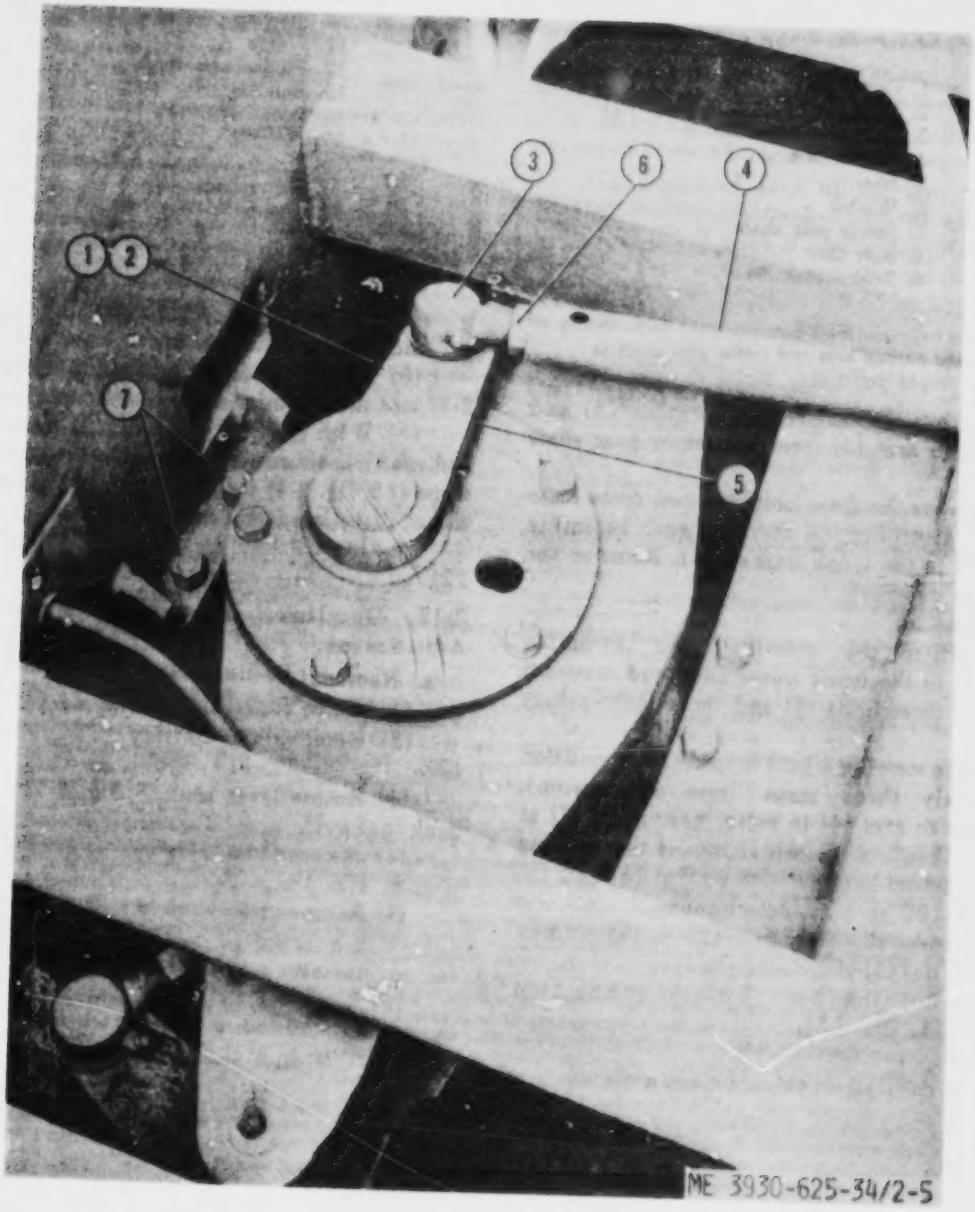
(2) Remove the battery (TM 10-3930-625-12).

(3) Rotate lever arm (5, fig. 2-5) forward or back to provide wrench accessibility for the nut (2).

(4) Release the draglink assembly from the pitman arm (para 2-14).

(5) Remove the cotter pin (1, fig. 2-5) and nut (2) which secures the ball joint (3) of the draglink (4) to the lever arm (5).

(6) Remove the draglink assembly (3, fig. 2-4) by pulling it forward through the front bulkhead and mast assembly.



1. Cotter pin (2)
2. Nut (2)
3. Ball joint (2)
4. Drag link
5. Lever arm
6. Jam nut (2)
7. Nut (8)

Figure 2-5. Drag link, removal or installation, and adjustment.

b. Installation.

(1) With forks raised approximately 52 inches pass the draglink assembly (4) through the mast assembly and front bulkhead and secure the ball joint (3) to the lever arm (5) with the nut (2) and cotter pin (1).

(2) Connect the drag link to the pitman arm (para 2-14).

(3) Install the battery (TM 10-3930-625-12).

c. Adjustments. The drag link (4) and ball joints (3) are adjusted by the manufacturer and are located with roll pins. No further adjustment should be necessary. However if a replacement drag link assembly requires adjustment, refer to paragraph 6-14 for procedure.

NOTE

The drag link assembly is properly adjusted when its length will permit its linkage to the pitman arm and steering arm when they are both in midtravel positions and the rear wheels are parallel to the center line of the truck.

2-16. Steering Axle Assembly, Removal and Installation

CAUTION

Do not operate the pump when the hydraulic oil reservoir is empty, as damage to the pump will result.

a. Removal.

(1) Remove the battery and drain the hydraulic oil reservoir (TM 10-3930-625-12).

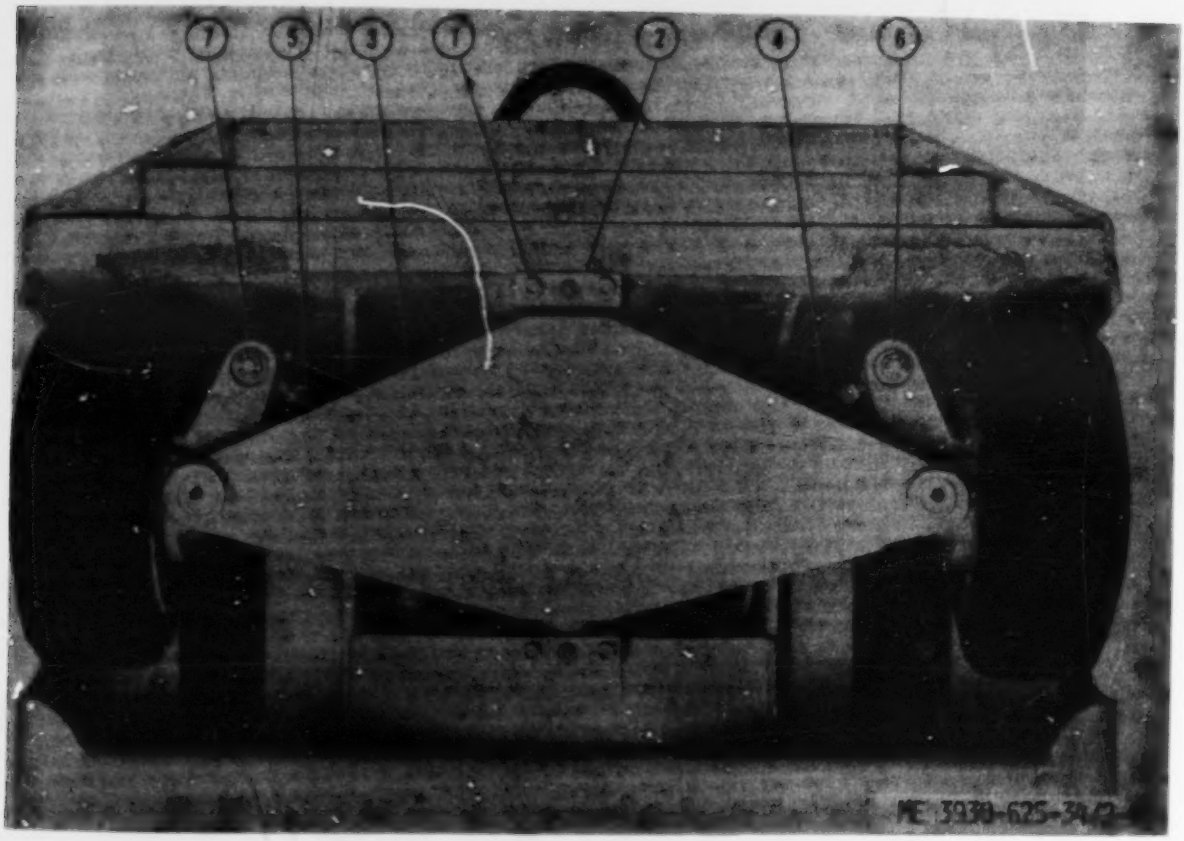
(2) Disconnect the drag link from the lever arm (para 2-15).

(3) Position suitable blocks back of the truck to protect the tow ring. Using another forklift truck or crane (6,000 lbs capacity), raise the truck by the front lifting eyes. Tilt it rearward until the counter weight is resting securely on the blocks.

(4) Use another forklift truck or crane to support and lift out steering axle.

(5) Remove the eight nuts (7, fig. 2-5) from the bolts attaching the steering axle assembly to the truck frame.

(6) Remove the four socket head bolts (1, fig. 2-6) attaching the pivot blocks (2) to the truck frame. Remove the steering axle assembly (3).



1. Socket head bolts (4)
2. Pivot block and thrust washer (2)
3. Steering axle assembly
4. Tie rod assembly right
5. Tie rod assembly left
6. Spindle, right hand
7. Spindle, left hand

Figure 2-6. Steering axle assembly, removal or installation.

b. Installation.

(1) Slide the thrust washers and pivot blocks (2) over the pivots and position to the truck frame. Secure in place with four socket head bolts (1), and eight nuts (7, fig. 2-5).

(2) Place the truck in an upright position.

(3) Connect the drag link to the lever arm (para 2-15).

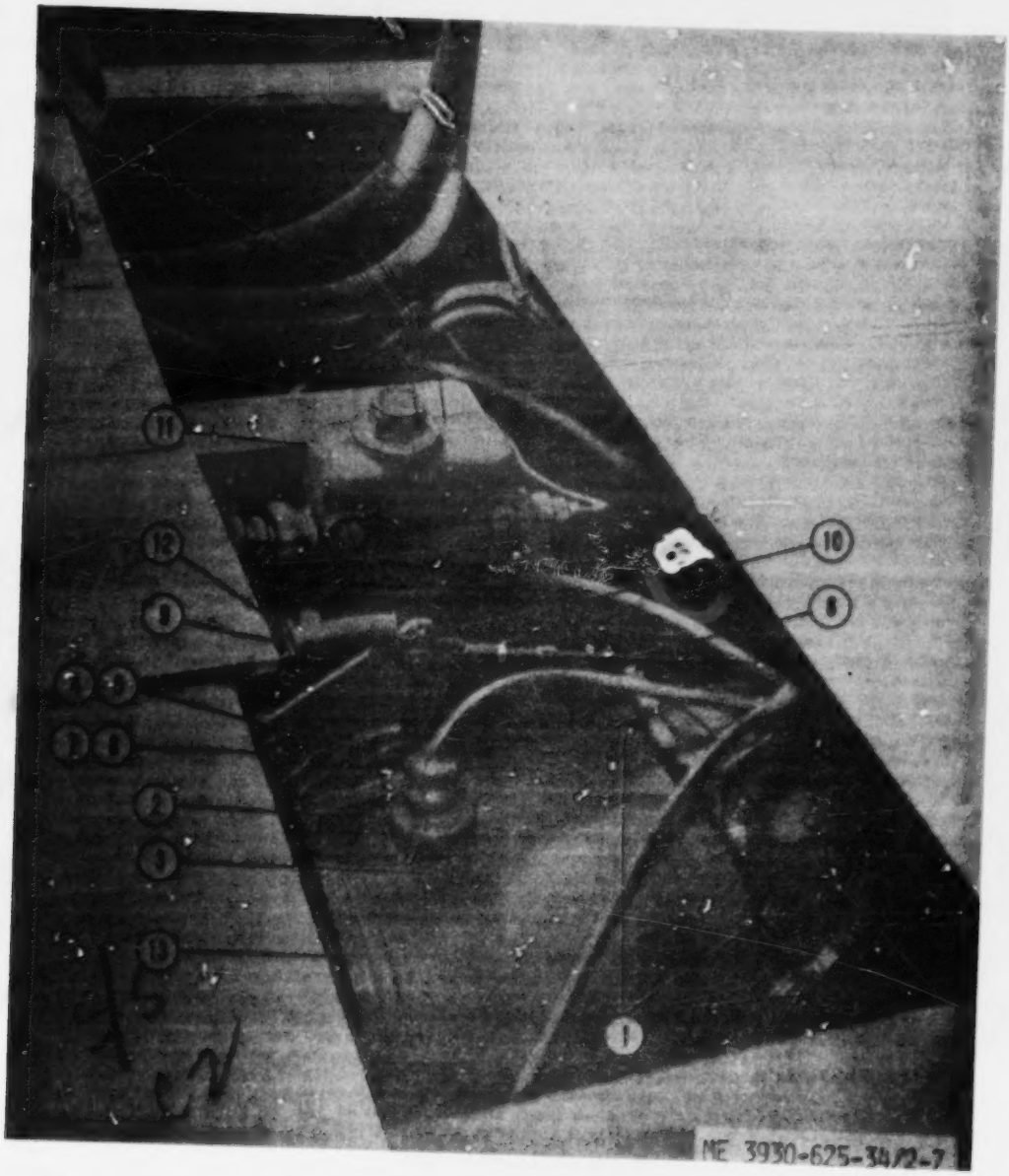
(4) Install the battery and fill the hydraulic reservoir (TM 10-3930-625-12).

2-17. Drive Assembly, Removal and Installation

a. Removal. The drive assembly includes the drive motor, drive motor support and coupling, differential and the final drive axles. It is installed in the forklift truck as a single unit and should be removed as such for adjustment, repair or parts replacement. To remove the drive assembly, proceed as follows:

(1) Remove the floor plates (TM 10-3930-625-12).

(2) Tag and disconnect the electrical leads at the drive motor terminals (1, fig. 2-7).



1. Drive motor terminals (5)
2. Rubber boot
3. Thermostat
4. Cotter pin
5. Clevis pin
6. Cable assembly
7. Cotter pin
8. Clevis pin
9. Extension spring
10. Brake crank
11. Hydraulic brake master cylinder
12. Brake switch
13. Motor support and coupling

Figure 2-7. Drive motor, connections and seat brake crank linkage, removal or installation.

(3) Remove the rubber boot (2), take out the two screws attaching the thermostat (3) to the motor frame, and lift away the thermostat.

(4) Remove the cotter pin and clevis pin that attaches the seat brake cable (6) to the brake crank (10), and release the cable assembly.

(5) Release the extension spring (9) from the brake crank (10).

CAUTION

Do not operate the hydraulic pump when the reservoir is empty as damage to the pump will result.

(6) Remove the battery and drain the hydraulic oil reservoir (TM 10-3930-625-12).

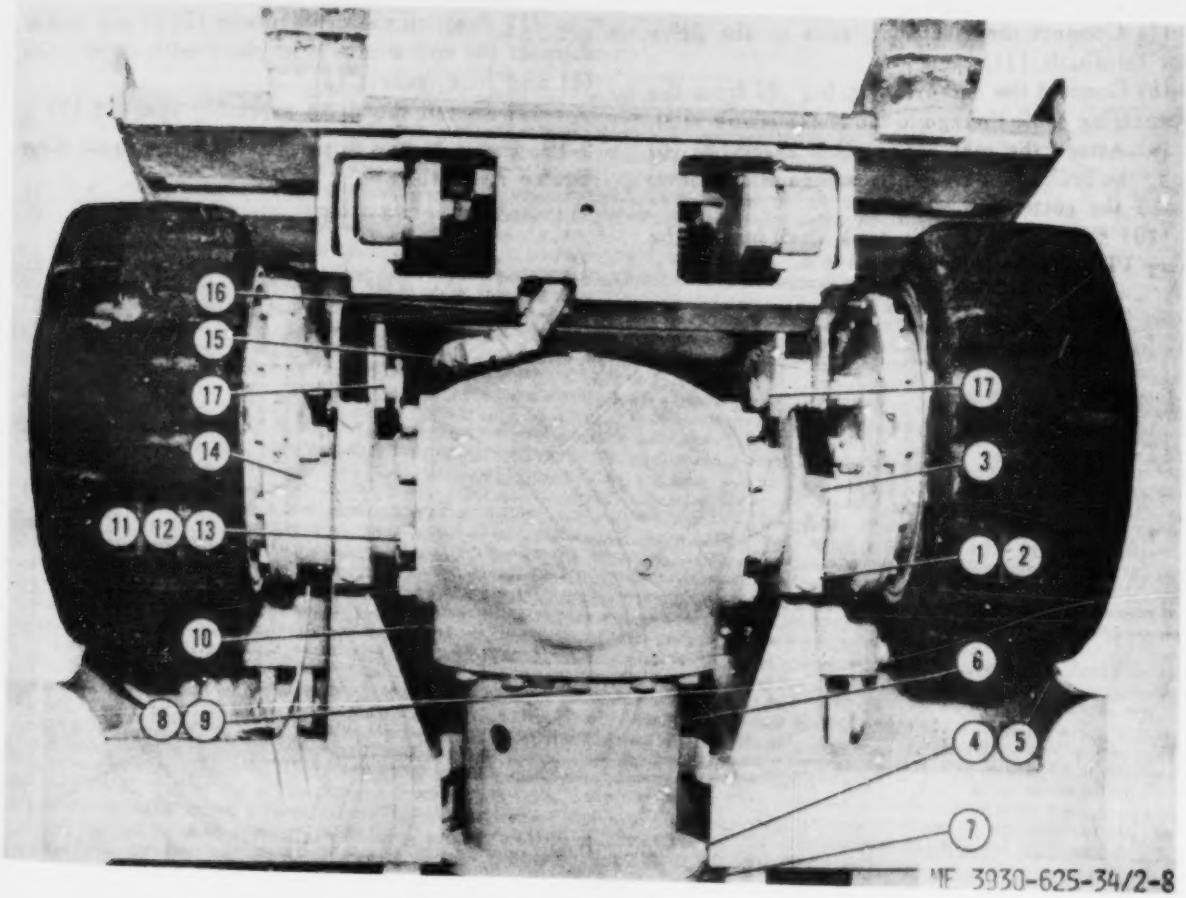
(7) Position suitable blocks back of the truck to protect the tow ring. Using another forklift truck or a crane (6,000 lbs capacity), raise the forklift truck by the front lifting eyes. Tilt it rearward until the counter weight is resting securely on the blocks.

(8) Disconnect the hydraulic brake lines (16, fig. 2-4).

(9) Using another forklift truck, place the forks underneath tires or, using a crane with a lifting yoke, attach the lifting cables to the drive axles and take up the cable slack.

(10) Remove the two nuts (15, fig. 2-4), lockwashers (14) and bolts (13) that attach the differential housing to the differential support bracket.

(11) Remove the four bolts (1, fig. 2-8) and four lockwashers (2) that secure the drive axle to the truck frame. These bolts attach the axle by securing the two bottom halves of the axle support blocks (two bolts in each block). Remove the two bottom halves of the support blocks (3).



1. Bolt (4)
2. Lockwasher (4)
3. Axle support blocks (2)
4. Bolt (8)
5. Lockwasher (8)
6. Motor support
7. Drive motor
8. Capscrew (7)
9. Lockwasher (7)
10. Differential
11. Nut (8 reqd)
12. Lockwasher (4)
13. Dowel (4)
14. Axle housing (2)
15. Hydraulic connection to lift cylinder
16. Hydraulic flow control valve
17. Mast pivot pins (2)

Figure 2-8. Drive assembly, removal or installation.

(12) Lift out entire drive assembly as a unit.

b. Installation.

(1) With the forklift truck resting on the counter weight, use another forklift truck or crane with a lifting yoke to position the drive assembly in the upper halves of the axle support blocks.

(2) Attach the two bottom halves of the axle support blocks (3) by means of bolts (1) and lockwashers (2).

(3) Install the two sets of nuts (15, fig. 2-4), bolts (13) and lockwashers (14) which attach the support bracket atop the differential housing.

(4) Connect the hydraulic brake lines (16) at the axle housing.

(5) Using a forklift truck or crane (6000 lbs), lift the forklift truck by the front lifting eyes and place it in an upright position.

(6) Install the thermostat (3, fig. 2-7) on the motor by means of two screws and lockwashers and slip the boot (2) over the connection.

(7) Connect the electrical leads to the drive motor terminals (1).

(8) Connect the extension spring (9) from the self-centering cable linkage to the brake crank (10).

(9) Attach the seat brake cable assembly (6) yoke to the brake crank (10) by means of the clevis pin and the cotter pin.

(10) Fill the hydraulic tank and install the battery (TM 10-3930-625-12).

c. Adjustment.

(1) *Self-centering switch cable.* Adjust the free movement of the self-centering switch cable by means of the jam nut and adjustable yoke on the seat actuated cable. With the seat down and direction switch in either forward or reverse position, slack in the cable should be barely perceptible.

(2) *Mechanical brake.* Refer to TM 10-3930-625-12.

2-18. Drive Motor Assembly, Removal and Installation

a. Removal.

(1) Remove the drive assembly (para 2-17).

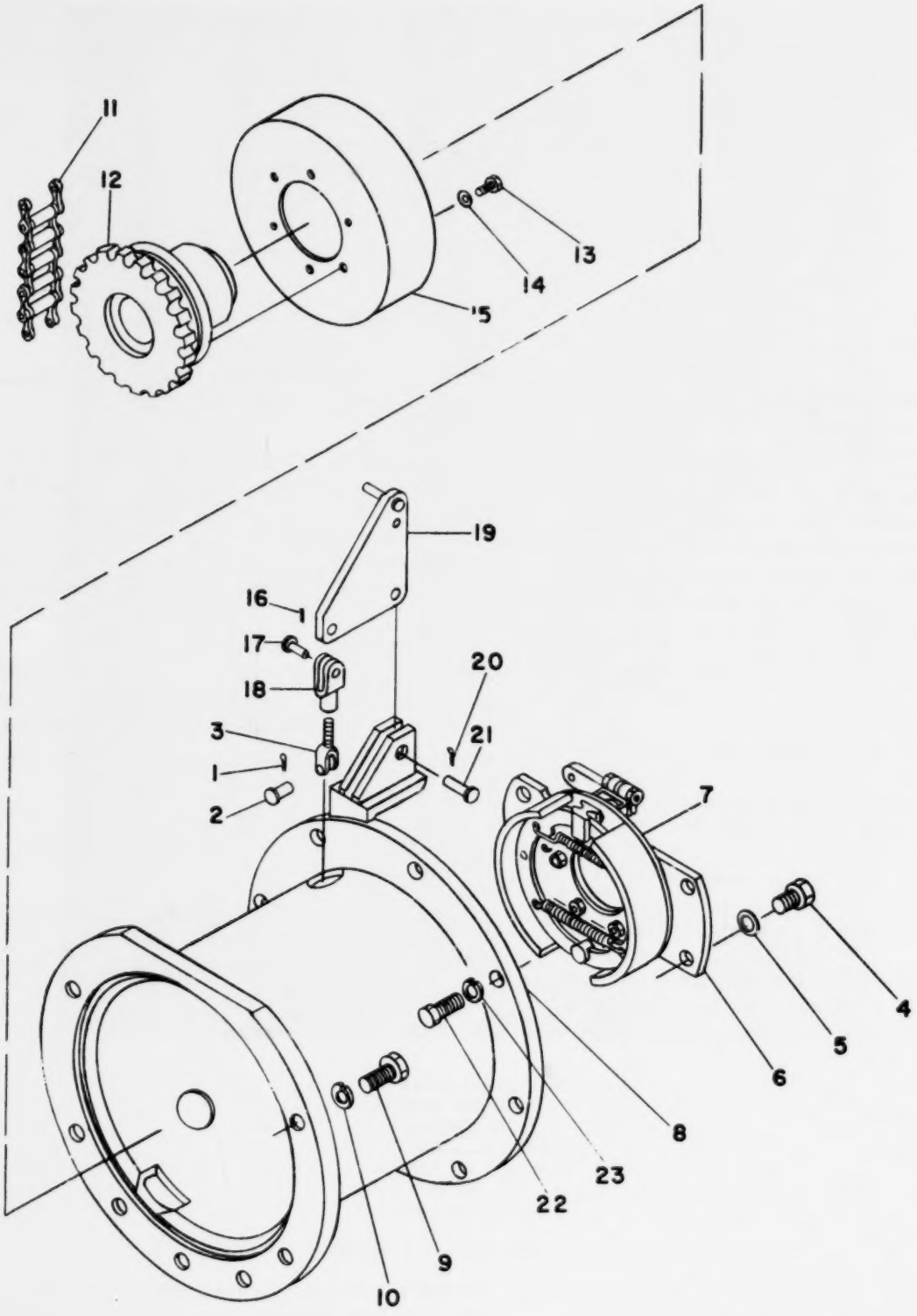
(2) Remove the eight bolts (4, fig. 2-8) and lockwashers (5) that attach the motor support (6) to the motor (7) and pull the drive motor from the support.

b. Installation.

(1) Position the drive motor (7) to the motor support (6) and secure it in place with eight bolts (4) and lockwashers (5).

(2) Install the drive assembly (para 2-17).

2-19. Drive Motor Support, Coupling and Seat Brake Assembly



ME 3930-625-34/2-9

Figure 2-9. Drive motor support, coupling and seat brake, removal or installation.

KEY to fig. 2-9:

1. Cotter pin
2. Clevis pin
3. Brake actuating rod
4. Screw (4)
5. Lockwasher (4)
6. Mounting bracket
7. Brake assembly
8. Drive motor support
9. Cap screw (7)
10. Lockwasher (7)
11. Coupling chain
12. Coupling, driving half
13. Cap screw (6)
14. Lockwasher (6)
15. Brake drum
16. Cotter pin
17. Clevis pin
18. Yoke
19. Brake crank
20. Cotter pin
21. Clevis pin
22. Cap screw (8)
23. Lockwasher (8)

a. Removal.

(1) Remove the drive motor assembly (para 2-18).

(2) Remove the cotter pin (1, fig. 2-9) and the clevis pin that attaches the brake actuating rod (3) to the brake lever. Lift out the brake actuating rod.

(3) Remove the four screws (4) and lockwashers (5) that attach the mounting bracket (6) to the motor support (8). Withdraw the brake assembly (7) and mounting bracket (6).

(4) Remove the seven cap screws (9) and lockwashers (10) and lift the motor support (8) away from the differential housing.

(5) Remove the coupling chain (11) from the coupling halves by pulling the cotter pin from the links.

b. Installation.

(1) Install the coupling chain (11) on the coupling halves.

(2) Position the motor support to the differential and secure it in place with seven capscrews (9) and lockwashers (10).

(3) Install the brake assembly (7) and mounting bracket (6) on the motor support and secure in place with four screws (4) and lockwashers (5).

(4) Attach the brake actuating rod (3) to the brake lever with a clevis pin (2) and cotter pin (1).

(5) Install the drive motor assembly (para 2-18).

2-20. Drive Axle, Wheel, and Final Drive Assembly, Removal and Installation

a. Removal.

(1) Remove the motor support (para 2-19).

(2) Remove each axle housing (14, fig. 2-8) from the differential (10) by removing eight nuts (11), four lockwashers (12) and four dowels (13).

b. Installation. Position each axle housing (14) to the differential (10) and secure with four dowels (13), four lockwashers (12) and eight nuts (11).

2-21. Differential Assembly

Refer to paragraphs 2-19 and 2-20 for removal and installation of the differential assembly, by the removal and installation of adjacent assemblies.

2-22. Hydraulic Mast Column, 100-Inch Lift, Removal and Installation

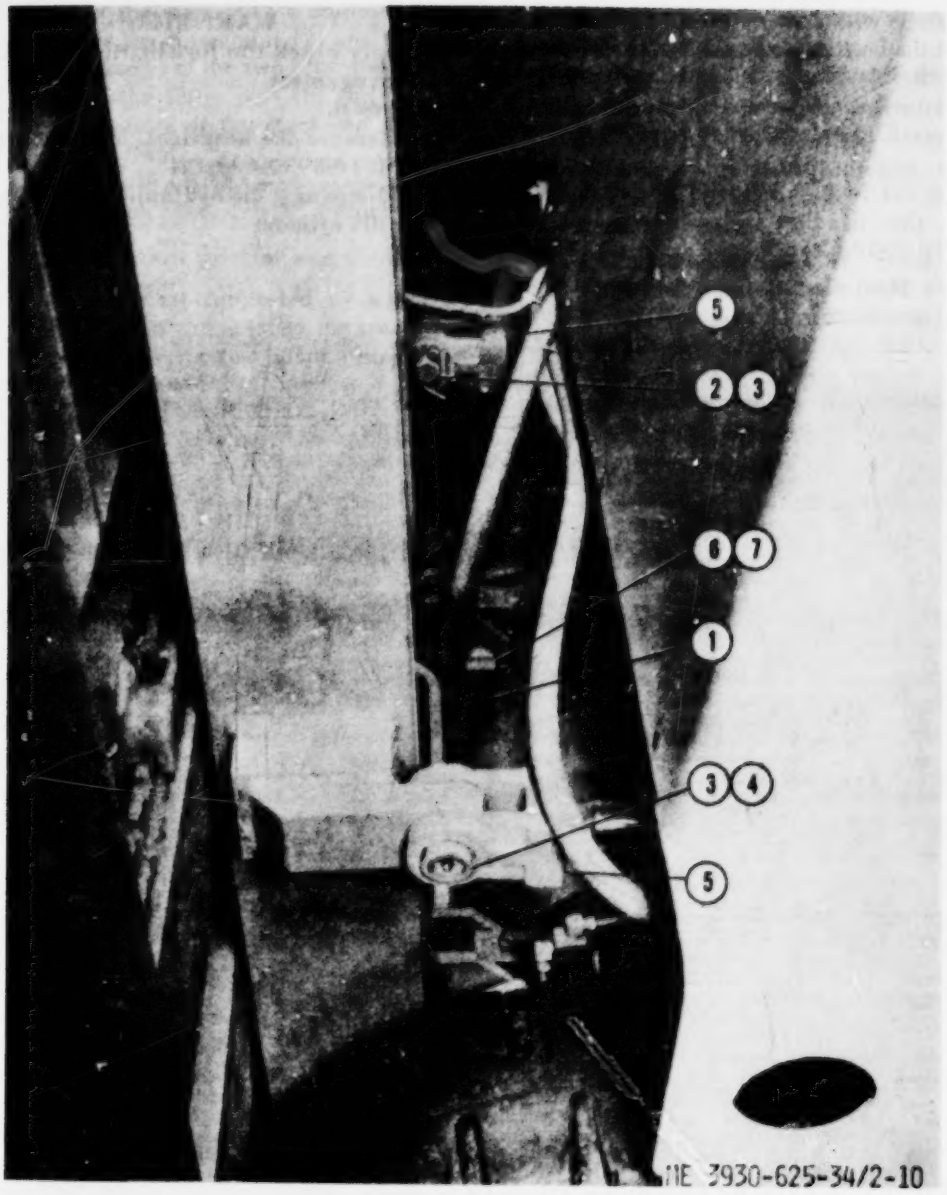
WARNING

Securely block the forklift truck before removing mast.

a. Removal.

(1) Remove the headlight, load backrest and forks (TM 10-3930-625-12).

(2) Disconnect the hydraulic line (1, fig. 2-10) from the lift cylinder.



1. Hydraulic line to lift cylinder
2. Cotter pin (2)
3. Clevis pin (2)
4. Lubrication fitting (2)
5. Yoke, tilt cylinder (2)
6. Cotter pin (2)
7. Pivot pin (2)

Figure 2-10. Hydraulic mast column, 100-inch lift, removal or installation.

(3) Support the mast with a crane of forklift truck and remove the cotter pins (2) and clevis pin (3) from each yoke (5) of the two tilt cylinders.

(4) Remove the cotter pin (6) and two pivot pins (7) at the bottom of the mast and pull mast away from truck frames.

WARNING

Securely block the truck before installing mast.

b. Installation.

(1) With the mast supported by a crane or forklift truck, position the mast to the truck frame

and secure in place with two pivot pins (7) and cotter pins (6) at the bottom of the mast.

(2) Install the clevis pin (3) and two cotter pins (2) which attach each yoke (5) of the two tilt cylinders to the mast. Remove the supporting crane or forklift truck.

(3) Connect the hydraulic line (1).

(4) Install the headlight, fork and load backrest (TM 10-3930-625-12).

2-23. Hydraulic Mast Column, 180 Inch Lift, Removal and Installation

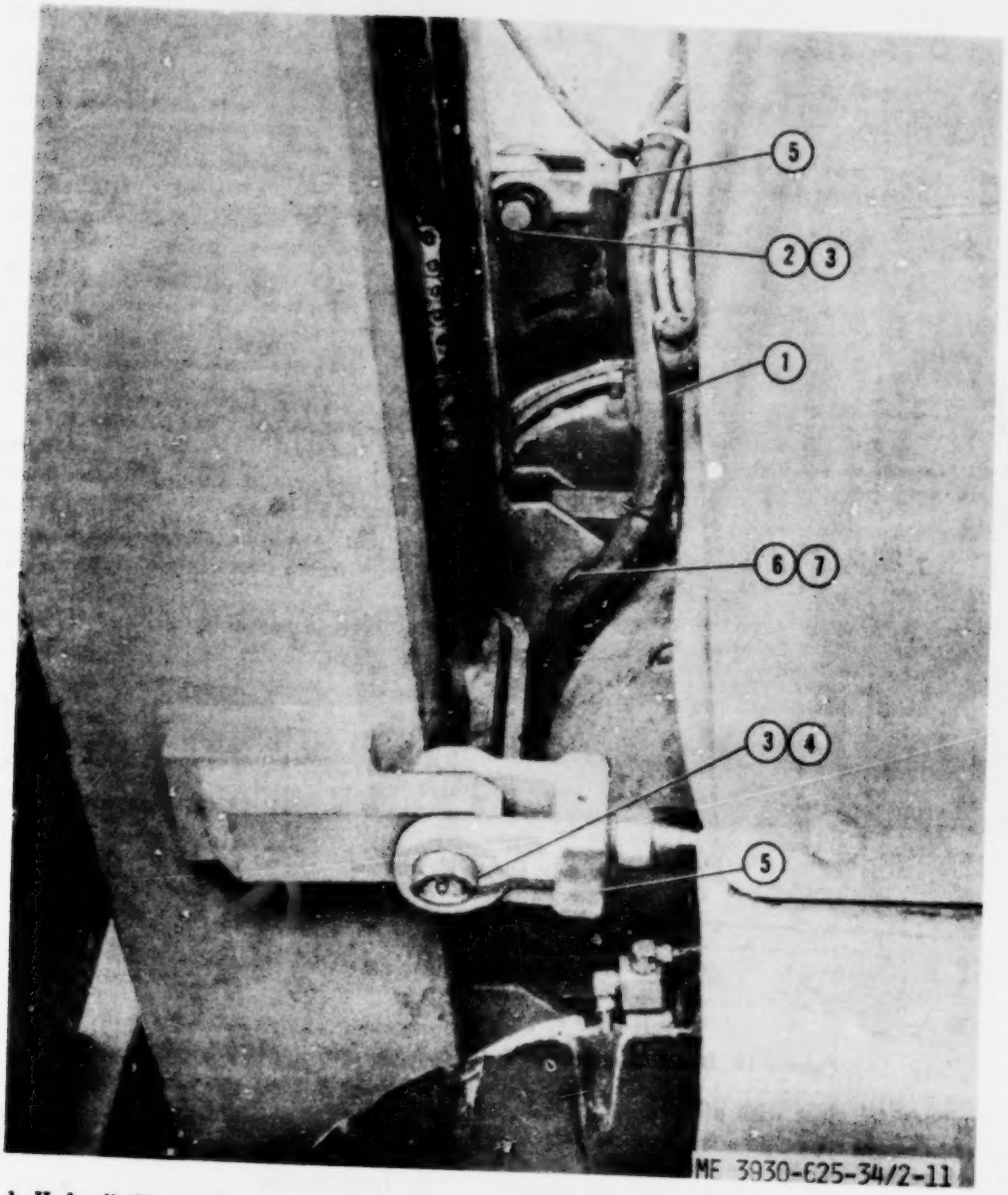
WARNING

Securely block the forklift truck before removing mast.

a. Removal.

(1) Remove the headlight, load backrest and forks (TM 10-3930-625-12)

(2) Disconnect the hydraulic line (1, fig. 2-11) from the lift cylinder.



1. Hydraulic line to lift cylinder
2. Cotter pin (2)
3. Clevis pin (2)
4. Lubricating fitting (2)
5. Yoke, tilt cylinder (2)
6. Cotter pin (2)
7. Pivot pin (2)

Figure 2-11. Hydraulic mast column, 180-inch lift, removal or installation.

(3) Support the mast with a crane or forklift truck and remove the cotter pins (2) and clevis pin (3) from each yoke (5) of the two tilt cylinders.

(4) Remove the cotter pins (6) and two pivot pins (7) at the bottom of the mast and pull mast away from truck frame.

WARNING

Securely block the truck before installing mast.

b. Installation.

(1) With the mast supported by a crane or forklift truck, position the mast to the truck frame and secure in place with two pivot pins (7) and cotter pins (6) at the bottom of the mast.

(2) Install the clevis pin (3) and two cotter pins (2) which attach each yoke (5) of the two tilt cylinders to the mast. Remove the supporting crane or forklift truck.

(3) Connect the hydraulic line (1).

(4) Install the headlight, fork and load backrest (TM 10-3930-625-12).

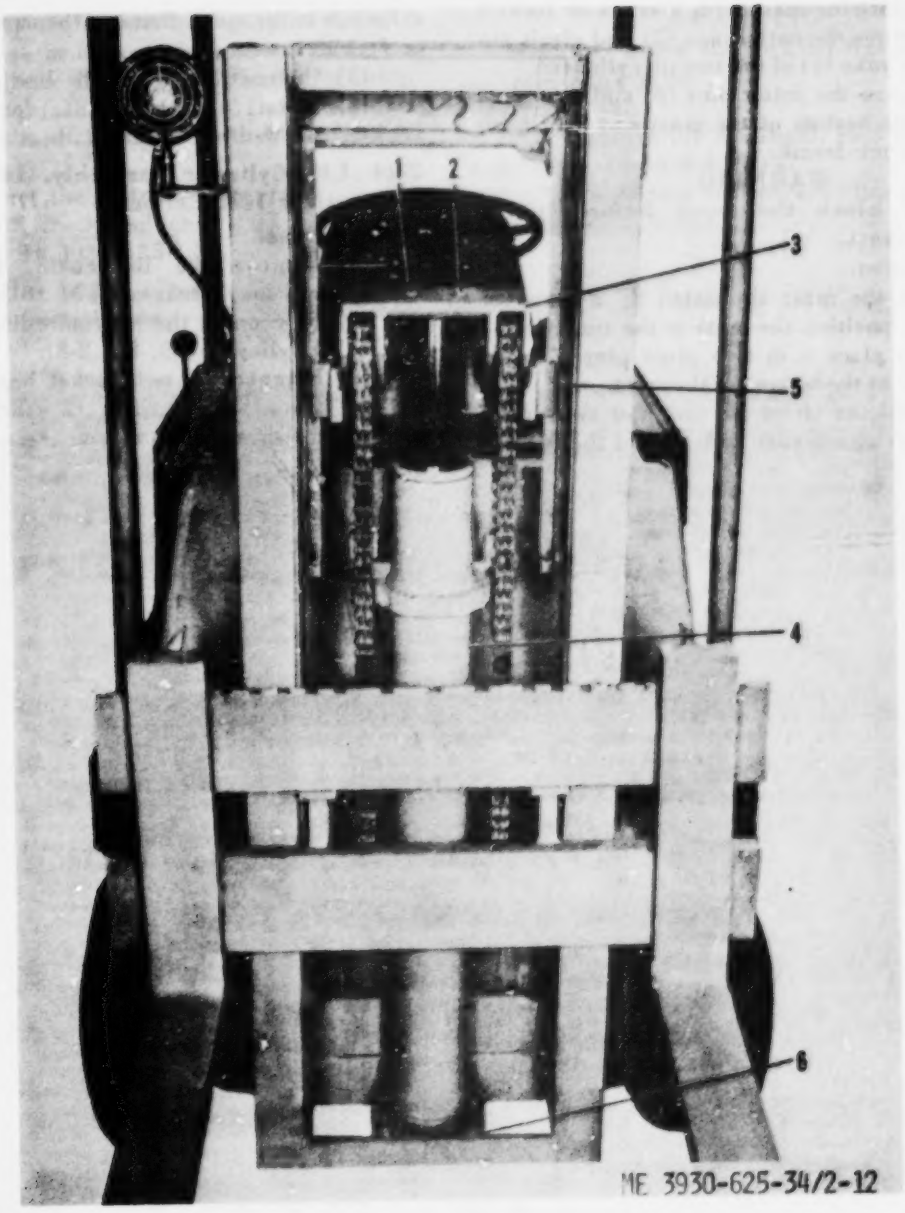
2-24. Lift Cylinder Assembly, 100-Inch Lift, Removal or Installation

a. Removal.

(1) Remove the lift chain, forks, lifting carriage and load backrest (TM 10-3930-625-12).

(2) Disconnect the hydraulic line at the base of the lift cylinder (15, fig. 2-8).

(3) Remove the two socket head screws (1, fig. 2-12) and lockwashers (2) that secure the cylinder crosshead (3) to the top of the cylinder (4).



1. Socket head screw (2)
2. Lockwasher (2)
3. Cylinder crosshead
4. Lift cylinder
5. Guides
6. Well

Figure 2-12. Hydraulic lift cylinder, 100-inch lift, removal or installation.

(4) Slide the cylinder crosshead (3) upwards in its guides (5) and block or otherwise secure it to prevent it from sliding down when the lift cylinder (4) is removed.

(5) Lift the cylinder out of the well (6).

b. Installation.

(1) Position the cylinder (4) in the well (6).

(2) Attach the cylinder crosshead (3) to the top of the cylinder with two socket head screws (1) and lockwashers (2).

(3) Connect the hydraulic line at the base of the cylinder (15, fig. 2-8).

(4) Install the lifting carriage, load backrest, forks and lift chain (TM 10-3930-625-12).

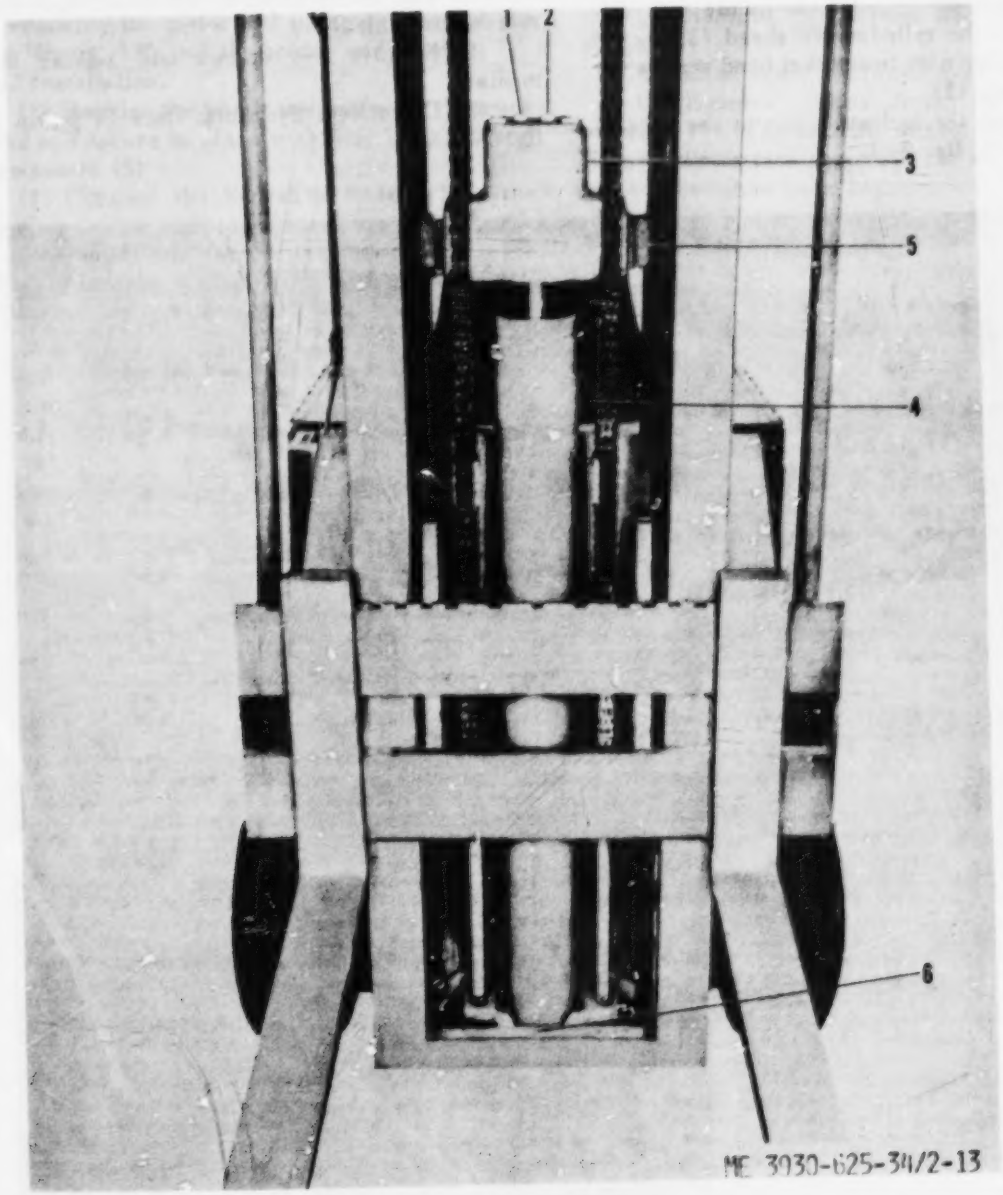
2-25. Lift Cylinder Assembly, 180-Inch Lift, Removal or Installation

a. Removal.

(1) Remove the lift chain, forks, lifting carriage and load backrest (TM 10-3930-625-12).

(2) Disconnect the hydraulic line at the base of the lift cylinder (15, fig. 2-8).

(3) Remove the two socket head screws (1, fig. 2-13) and lockwashers (2) that secure the cylinder crosshead (3) to the top of the cylinder (4).



1. Socket head screw (2)
2. Lockwasher (2)
3. Cylinder crosshead
4. Lift cylinder
5. Guides
6. Well

Figure 2-13. Hydraulic lift cylinder, 180-inch lift, removal or installation.

(4) Slide the cylinder crosshead (3) upwards in its guides (5) and block or otherwise secure it to prevent it from sliding down when the lift cylinder (4) is removed.

(5) Lift the cylinder out of the well (6).

b. Installation.

(1) Position the cylinder (4) in the well (6).

(2) Attach the cylinder crosshead (3) to the top of the cylinder with two socket head screws (1) and lockwashers (2).

(3) Connect the hydraulic line at the base of the cylinder (15, fig. 2-8).

(4) Install the lifting carriage, load backrest, forks and lift chain (TM 10-3930-625-12).

2-26. Hydraulic Pump and Motor, Removal and Installation

a. Removal.

(1) Tag and disconnect electrical leads from motor terminals.

(2) Remove two screws and release thermostat.

(3) Disconnect hydraulic lines to pump (1, fig. 2-14).

Figure 2-14. Hydraulic pump and motor, removal or installation.

KEY to fig. 2-14:
1. Hydraulic line connections to pump (2)
2. Hydraulic pump
3. Hydraulic pump motor
4. Bolt (4)
5. Lockwasher (4)

(3) Remove four bolts (4) and lockwashers (5) attaching the motor and pump supports to the truck frame. Lift out the motor and pump.

b. Installation.

(1) Position the pump and motor on the truck frame and secure in place with four bolts (4) and lockwashers (5).

(2) Connect the hydraulic lines (1) to the pump.

(3) Install the thermostat. Secure in place with two screws.

(4) Connect electrical leads to motor terminals.

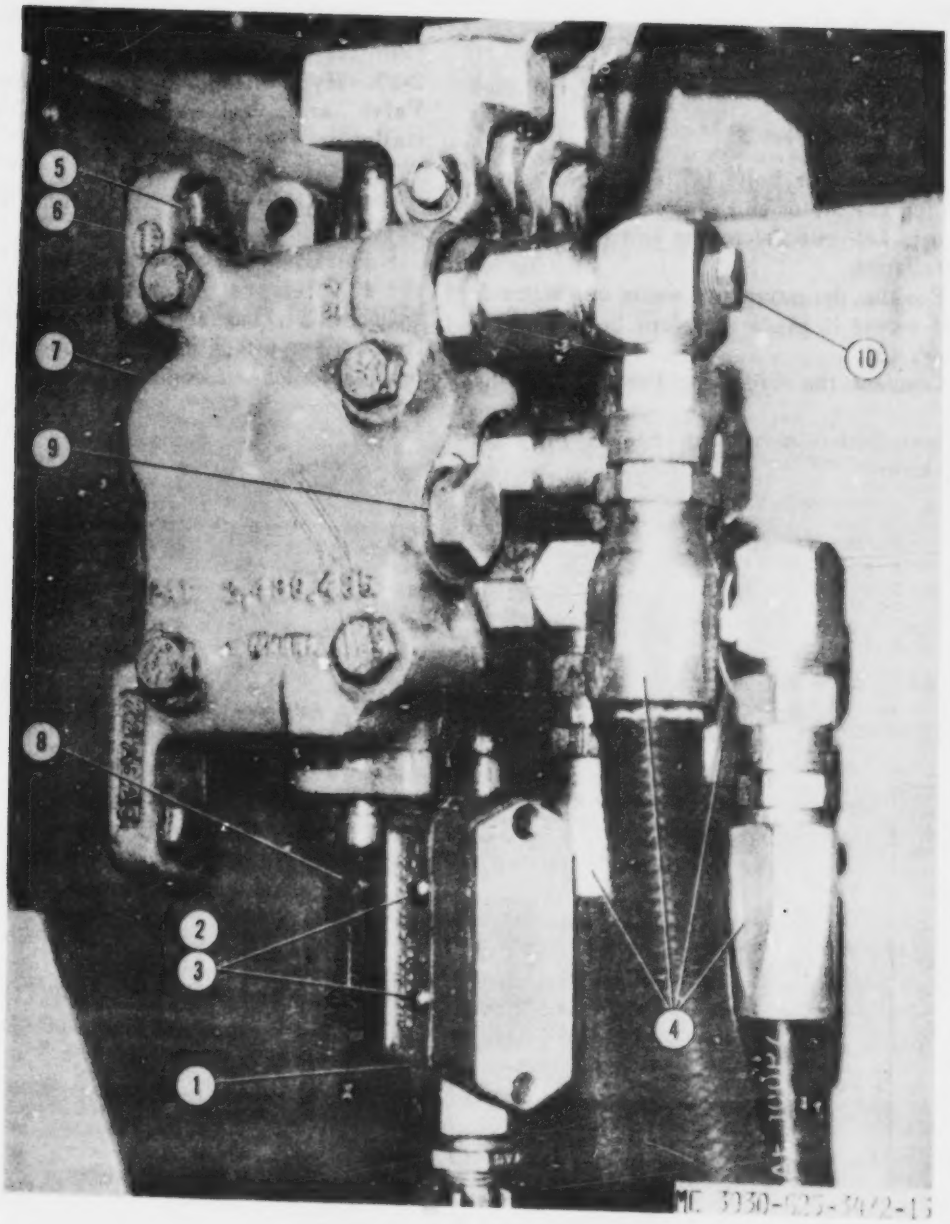
2-27. Hydraulic Directional Control (Stack) Valve and Valve Switches, Removal, Installation and Adjustment

a. Removal.

(1) Remove two screws and lift off metal shield.

(2) Disconnect hydraulic lines (4, fig. 2-15).

(3) Remove covers from the two micro switches (1). Tag and disconnect electrical leads. Remove two attaching screws (2) and nuts (3) and remove switches from bracket.



1. Micro switch (2)
2. Screws (4)
3. Nuts (4)
4. Hydraulic lines (5)
5. Cap screws (3)
6. Lockwashers (3), Nut (1)
7. Directional control valve
8. Plastic cams (2)
9. Relief valve insert
10. Plug, test gauge connection

Figure 2-15. Hydraulic directional control (stack) valve, removal or installation.

(4) Remove three capscrews (5), three lockwashers and one nut (6) attaching the directional control valve (7) to the truck frame, and lift off valve.

b. Installation.

(1) Position the stack valve (7) to the mounting frame and secure in place with three capscrews (5) and three lockwashers and one nut (6).

(2) Position micro switches (1) on bracket and secure in place with two screws (2) and nuts (3). Connect leads and install covers.

(3) Connect hydraulic lines (4).

c. Adjustment, Hydraulic Directional Control Valve Switches.

(1) Loosen two mounting screws (2) on microswitches (1). Adjust switches in horizontal elongated holes in mounting bracket to one inch movement of the tilt or lift lever in either direction before switches will activate the hydraulic pump motor. Position switch roller to ensure:

(a) Tilt inward. Pump starts before valve opens.

(b) Tilt outward. Pump starts after valve opens.

(c) Lift load. Pump starts before valve opens.

(d) Lower load. Pump does not start.

(2) Tighten the mounting screws (2) and check operation. If unsatisfactory repeat (1) preceding.

CAUTION

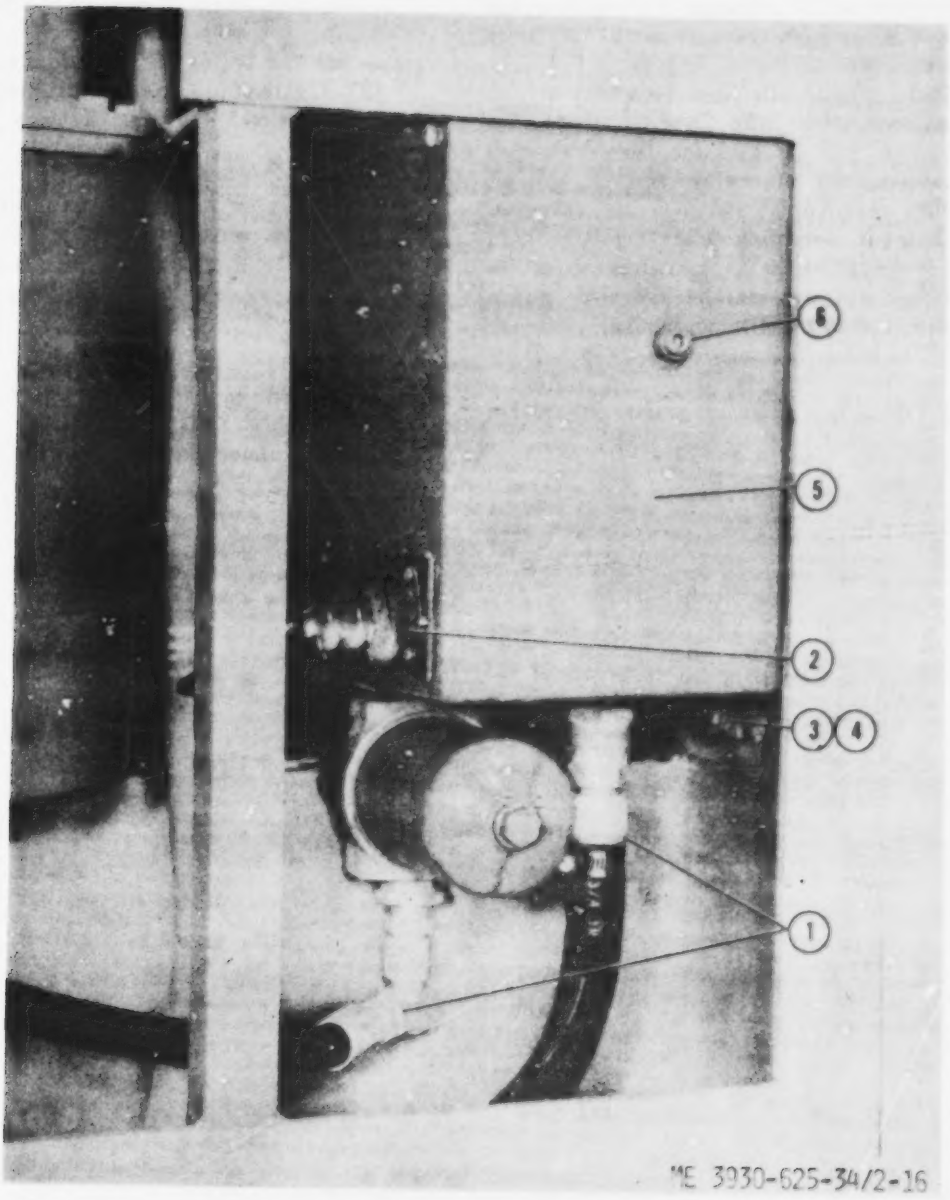
Do not operate the pump while the hydraulic oil reservoir is empty as damage to the pump will result.

2-28. Hydraulic Oil Reservoir, Removal and Installation

a. Removal.

(1) Drain the hydraulic oil reservoir (TM 10-3930-625-12).

(2) Disconnect hydraulic lines (1, fig. 2-16).



1. Hydraulic line connection (2)
2. Thermostat (2)
3. Bolt (3)
4. Lockwasher (3)
5. Hydraulic oil reservoir
6. Reservoir drain plug

Figure 2-16. Hydraulic oil reservoir, removal or installation.

(3) Remove two thermostats (2).

(4) Remove the drag link (para 2-15).

(5) Remove the drive assembly (para 2-17).

(6) Remove three bolts (3, fig. 2-16) and lockwashers that attach the reservoir (5) to the truck frame, and lift out reservoir.

b. Installation.

(1) Position the hydraulic oil reservoir (5) to the truck frame and secure it in place with three bolts (3) and lockwashers (4).

(2) Install the thermostat (2).

(3) Connect the hydraulic lines (1).

(4) Install the drive assembly (para 2-17).

(5) Install the drag link (para 2-15).

(6) Fill the hydraulic oil reservoir (5) (TM 10-3930-625-12).

CHAPTER 3

REPAIR OF ELECTRICAL SYSTEM

Section I. BATTERY CONNECTOR

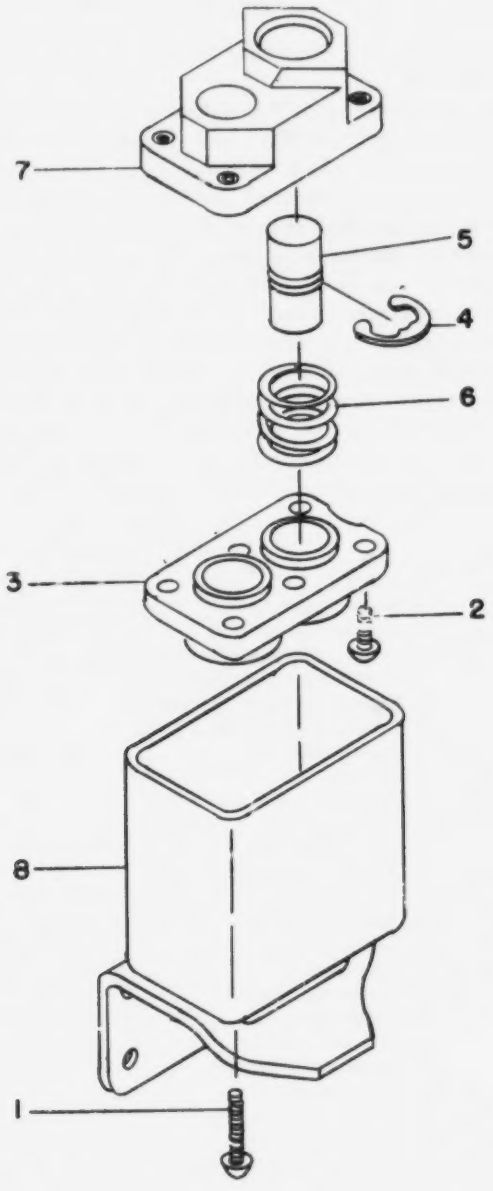
3-1. General

The battery connector connects the battery to either the truck electrical system for power delivery or to an external power supply for recharging. The connector has a rating of 250 volts and 300 amperes, and will accommodate No. 1/0 cable.

3-2. Removal and Disassembly

a. Remove the battery connector (TM 10-3930-625-12).

b. Refer to figure 3-1 and disassemble the battery connector.



ME 3930-625-34/3-1

Figure 3-1. Battery connector, disassembly or reassembly.

KEY to fig. 3-1:
1. Screw (2)
2. Screw (2)
3. Insulation block, lower
4. Retaining ring for power contact (2)
5. Power contact (2)
6. Power contact spring (2)
7. Insulation block, upper
8. Half case, mounting

3-3. Cleaning, Inspection and Repair

a. cleaning. Wipe all parts with a clean dry cloth. Remove any pits or burns from the power contacts with No. 00 sandpaper.

b Inspection and Repair. Inspect all parts for damage or defects. Examine springs for effective tension. Replace any defective parts.

3-4. Reassembly

Refer to figure 3-1 and reassemble the battery connector.

3-5. Installation

Install the battery connector (TM 10-3930-625-12).

Section II. CONTACTORS AND SCR CONTROLS

3-6. General

The 1A, L, F and R, and P contactors and the SCR (silicon controlled rectifier) are mounted in the electrical control box located beneath the operator's seat. They can be removed individually without removing the electrical control box. The 1A and L contactors are similar in construction and the F and R contactors are similar in construction. The L contactor, energized through the emergency switch, supplies power to the drive motor control circuit and the hydraulic pump motor control circuit. The F and R contactors are energized by the directional control and accelerator switches. The F and R contactors determine the polarity available for the drive motor field coils. The SCR control provides stepless operation of the truck up to 70-90% speed on level terrain. For full speed operation, the 1A contactor closes to supply full battery voltage to the motor by bypassing the SCR control. The SCR control includes a plug-in type printed circuit card (card 1) on which is mounted an oscillator, timing, firing and delay circuits. Card 1 provides solid state circuiting with trimpot adjustments for current limit, plugging, 1A timer, creep speed and top speed control.

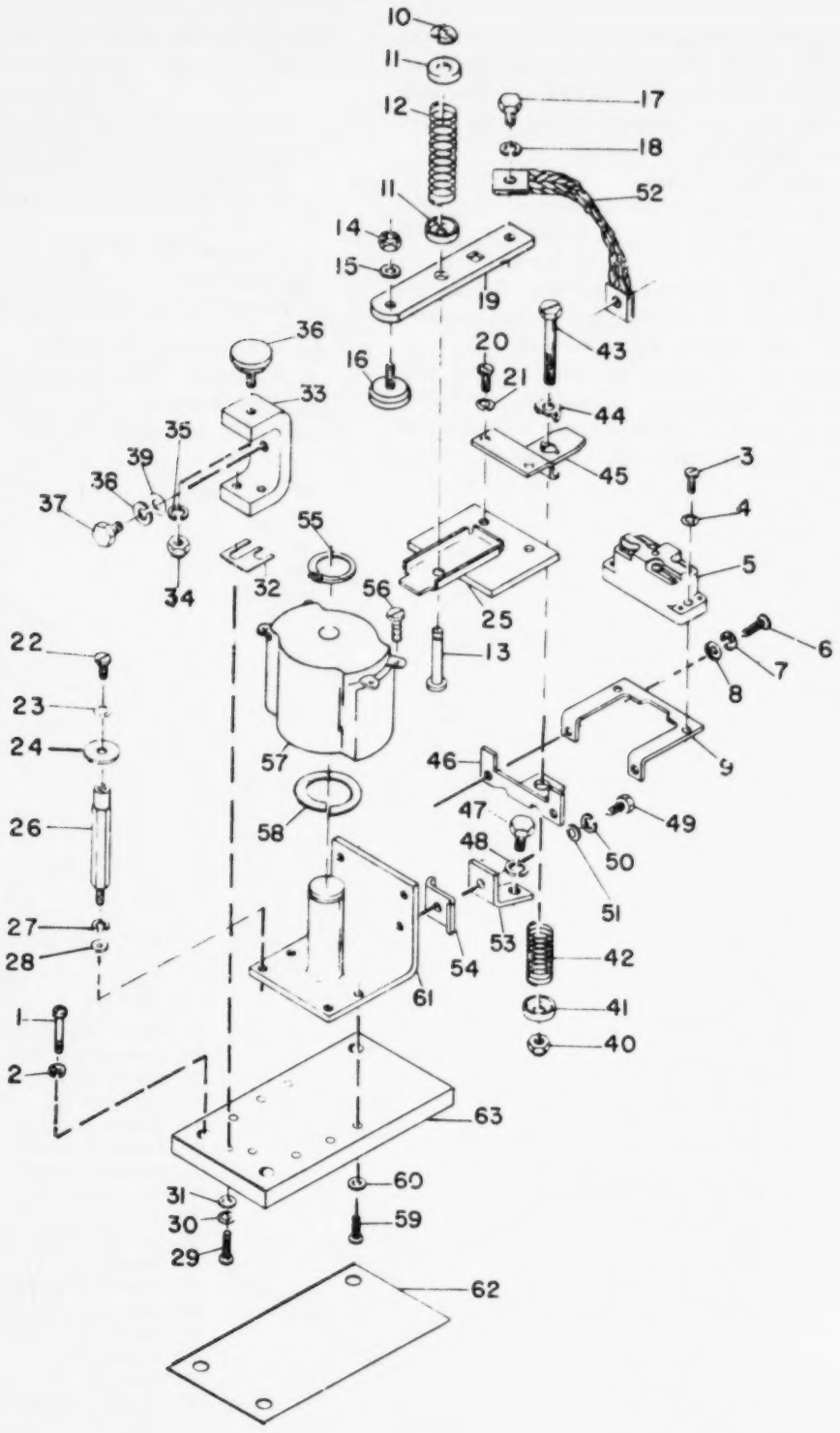
3-7. Contactors 1A and L

a. Removal. Refer to paragraph 2-11.

b. Disassembly. Refer to figure 3-2 and disassembly contactor 1A or L.

KEY to fig. 3-2:

1. Screw, machine (8)
2. Lockwasher (3)
3. Screw, machine (1A only) (2)
4. Lockwasher (1A only) (2)
5. Switch, interlock (1A only)
6. Screw, machine (2)
7. Lockwasher (2)
8. Washer, flat (2)
9. Support, switch (1A only)
10. E-Ring
11. Seat, spring (2)
12. Spring, compression
13. Pin, retaining
14. Nut, special
15. Lockwasher
16. Tip, contact
17. Screw, machine
18. Lockwasher
19. Support
20. Screw, machine (2)
21. Lockwasher (2)
22. Screw, machine (2)
23. Lockwasher (2)
24. Washer (armature stop)
25. Armature
26. Post (2)
27. Lockwasher (2)
28. Spacer (6)
29. Screw, machine (2)
30. Lockwasher (2)
31. Washer, flat (2)
32. Shim
33. Support
34. Nut, special
35. Lockwasher
36. Tip, contact
37. Screw, special
38. Lockwasher
39. Washer, flat
40. Nut, special
41. Seat, spring
42. Spring, compression
43. Screw, adjusting
44. Fulcrum
45. Guide, armature
46. Support, armature
47. Screw, special
48. Lockwasher
49. Screw, special
50. Lockwasher
51. Washer, flat
52. Shunt
53. Terminal
54. Clip, terminal
55. Ring, retaining
56. Screw, machine (2)
57. Coil, operating
58. Washer, spring
59. Screw, machine (2)
60. Lockwasher (2)
61. Frame, magnet
62. Insulation
63. Base



ME 3930-625-34/3-2

Figure 3-2. Contactors 1A and 1, disassembly or reassembly.

c. Cleaning. Wipe all parts with a clean dry cloth. Remove any small pitted or burned surfaces from contact surfaces with No. 00 sandpaper. Use low pressure clean, dry compressed air to clean dust from inaccessible areas.

d. Inspection and Repair.

(1) Inspect all parts for defects or damage. Inspect contacts for excessively burned or pitted areas. Examine contact armature springs for effective tension and braided leads for flexibility. Check alignment of armature retaining pin. Replace any defective or damaged part.

(2) Using a multimeter, set scale to Rx1 and measure the coil resistance. A reading of infinity will indicate an open circuit in the coil. A reading of zero will indicate a short-circuited coil or filter. If a reading of either infinity or zero is obtained, replace the coil.

NOTE

The green epoxy encapsulated coil contains an integrated coil filter. When this filter fails, it will be usually evident by a severe cracking of the coils in the vicinity of the coil terminals.

e. Reassembly. Refer to figure 3-2 and reassemble contactor 1A or L.

f. Installation. Refer to paragraph 2-11.

3-8. Contactors F and R

a. Removal. Refer to paragraph 2-11.

b. Disassembly. Refer to figure 3-3 and disassembly contactor F or R.

KEY to fig. 3-3:

1. Screw (4)
2. Lockwasher (4)
3. Washer, flat (4)
4. Switch, intlk (2)
5. Screw, pan hd (4)
6. Lockwasher (6)
7. Bracket, intlk switch (2)
8. Screw, hex-hd (2)
9. Lockwasher (2)
10. Bus
11. Screw, hex-hd (2)
12. Lockwasher (2)
13. Support, upper cont (2)
14. Nut, hex (8)
15. Tip, contact (8)
16. Screw, hex-hd (2)
17. Lockwasher (2)
18. Support, lwr-cont
19. Screw, flat hd (2)
20. Washer, ext lock (2)
21. Screw, pan hd (2)
22. Lockwasher (2)
23. Support, molded (2)
24. Screw, pan hd (2)
25. Lockwasher (2)
26. Washer, flat (2)
27. Screw, hex-hd (4)
28. Lockwasher (4)
29. Shunt, flexible (2)
30. Nut, hex (4)
31. Washer, cup (4)
32. Spring, armature (4)
33. Support, armature (2)
34. Pin, cotter (2)
35. Washer, cup (2)
36. Spring, contact (2)
37. Washer (2)
38. Armature assembly (2)
39. Arm assembly, R.H. & L.H.
40. Screw, fil-hd (2)
41. Lockwasher (2)
42. Core (2)
43. Washer, spring (2)
44. Coil (2)
45. Screw, hex-hd (2)
46. Lockwasher (2)
47. Frame magnet (2)
48. Insulation
49. Screw, machine pan hd (4)
50. Lockwasher (4)
51. Bus (2)

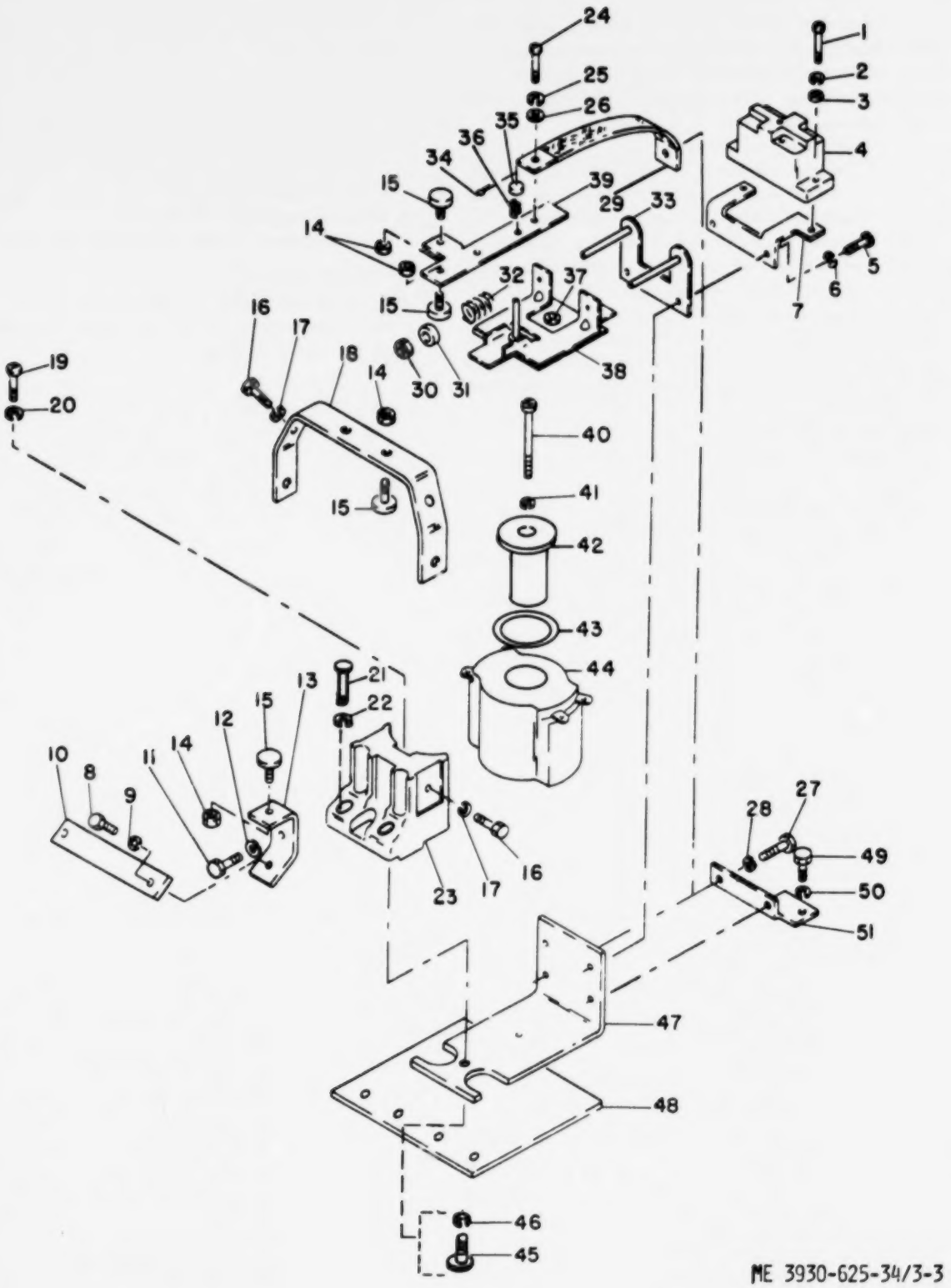


Figure 3-3. Contactor F and R, disassembly or reassembly.

c. Cleaning. Wipe all parts with a clean dry cloth. Remove any small pitted or burned surfaces from contact surfaces with No. 00 sandpaper. Use low pressure clean, dry compressed air to clean dust from inaccessible areas.

d. Inspection and Repair.

(1) Inspect all parts for defects or damage. Inspect contacts for excessively burned or pitted areas. Examine contact armature springs for effective tension and braided leads for flexibility. Check alignment of armature retaining pin. Replace any defective or damaged part.

(2) Using a multimeter, set scale to Rx1 and measure the coil resistance. A reading of infinity will indicate an open circuit in the coil. A reading of zero will indicate a short circuit in the coil or filter. If a reading of either infinity or zero is obtained, replace the coil.

NOTE

The green epoxy encapsulated coil contains an integrated coil filter. When this filter fails, it will be usually evident by a severe cracking of the coils in the vicinity of the coil terminals.

e. Reassembly. Refer to figure 3-3 and reassemble contactor F and R.

f. Installation. Refer to paragraph 2-11.

3-9. Contactor P

a. Removal. Refer to paragraph 2-11.

b. Disassembly. Refer to figure 3-4 and disassemble the P contactor.

KEY to fig. 3-4:

1. Bolt, hex-hd
2. Lockwasher
3. Contact tip & nut (2)
4. Bolt, hex-hd
5. Lockwasher
6. Contact
7. Screw, hex-hd (2)
8. Lockwasher (2)
9. Stop
10. Screw, machine
11. Lockwasher
12. Insulation
13. Screw, pan hd (2)
14. Lockwasher (2)
15. Support, contact
16. Screw, machine
17. Lockwasher
18. Washer, flat
19. Pin, cotter
20. Washer, cup
21. Spring
22. Contact arm assembly
23. Washer
24. Nut (2)
25. Washer, cup (2)
26. Spring (2)
27. Armature assembly
28. Bolt, hex-hd
29. Washer, flat (2)
30. Support (2)
31. Bolt, hex-hd
32. Lockwasher
33. Bolt, hex-hd (2)
34. Lockwasher (2)
35. Bus
36. Shunt assembly
37. Screw, machine
38. Lockwasher
39. Core
40. Washer, spring
41. Screw, machine (2)
42. Coil, operating
43. Frame, magnet

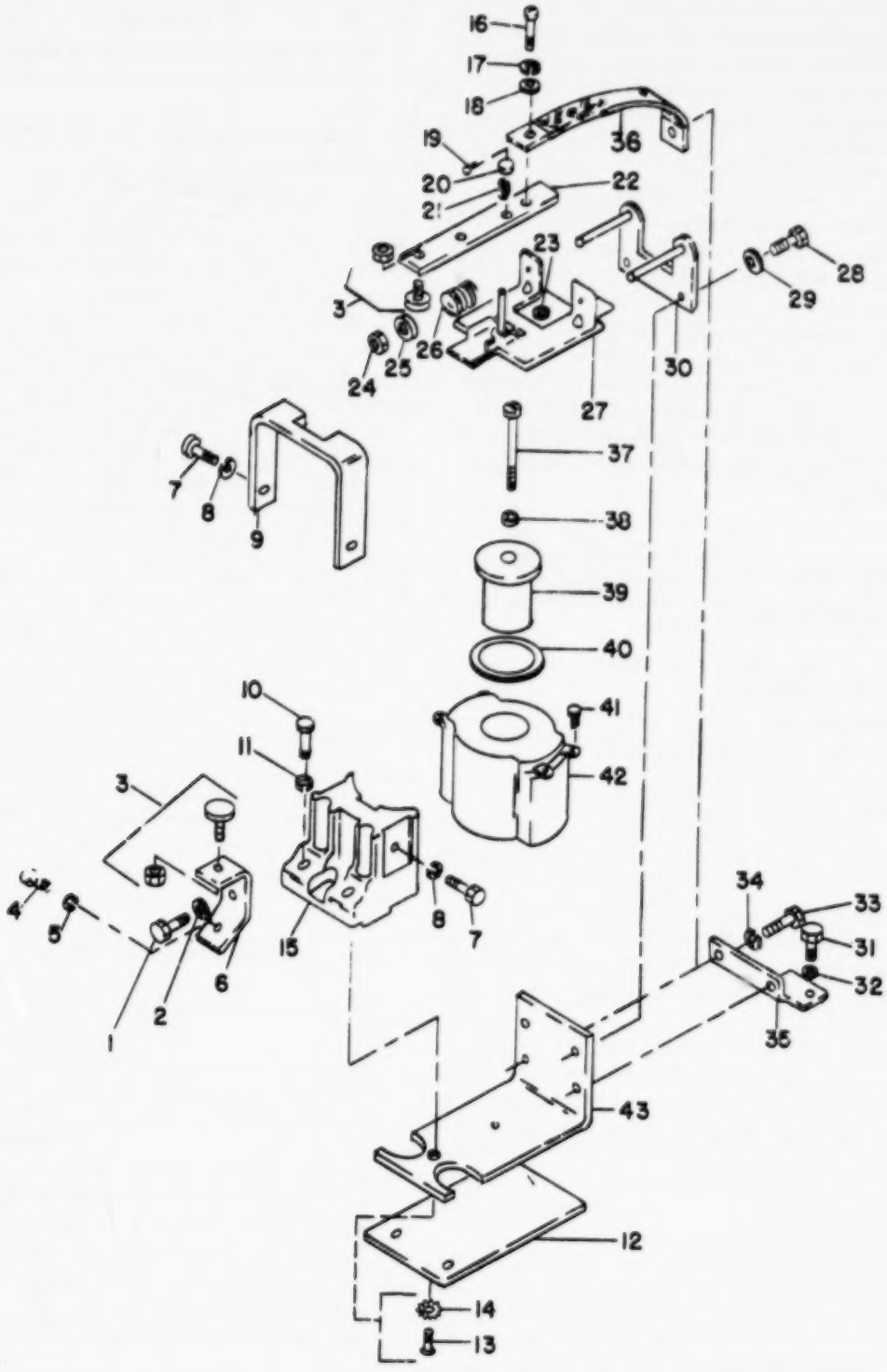


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Figure 3-4. Contactor P, disassembly or reassembly.

c. Cleaning. Wipe all parts with a clean dry cloth. Remove any small pitted or burned surface from contact surfaces with No. 00 sandpaper. Use low pressure clean, dry compressed air to clean dust from inaccessible areas.

d. Inspection and Repair.

(1) Inspect all parts for defects or damage. Inspect contacts for excessively burned or pitted areas. Examine contact armature springs for effective tension and braided leads for flexibility. Check alignment of armature retaining pin. Replace any damaged or defective part.

(2) Using a multimeter, set scale to Rx1 and measure the coil resistance. A reading of infinity will indicate an open circuit in the coil. A reading of zero will indicate a short-circuited coil or filter. If either an infinity or zero reading is obtained, replace the coil.

NOTE

The green epoxy encapsulated coil contains an integrated coil filter. When this filter fails, it will be usually evident by a severe cracking of the coils in the vicinity of the coil terminals.

e. Reassembly. Refer to figure 3-4 and reassemble P contactor.

f. Installation. Refer to paragraph 2-11.

3-10. Tests for Circuit Continuity

CAUTION

Do not operate the motor at high speeds or plug the motor with wheels jacked up.

a. Jack up the truck so that the drive wheels are free to rotate.

b. Connect jumper from battery positive to positive side of F or R coil. If contactor does not pick up, check coil for continuity. Also jumper negative to opposite terminal to check for open-circuit in negative connections.

c. With jumper on battery positive, move other end to wire 8 on F interlock (fig. 1-1) or wire 6 on R interlock. Corresponding coil should pick up. This proves F and R electrical interlocks.

d. Using jumper continue to check remaining components in circuit such as directional switch and brake switch by moving end of jumper to positive side of each of these components.

e. Replace defective components.

3-11. SCR Control Panel Assembly

CAUTION

Disconnect battery and discharge capacitor 1C (7, fig. 3-5) before touching electrical components.

KEY to fig. 3-5:

1. Main SCR (1 REC)
2. Turn-off SCR (2 REC)
3. Fly-back diode (3 REC)
4. Plugging diode (4 REC)
5. Blocking SCR (5 REC)
6. Current-limiting reactor (1X)
7. Commutating capacitor (1C)
8. Control circuit fuses
9. Oscillator card (card 1)
10. Thermal protector
11. Pulse transformer (1T)
12. Creep-speed adjustment
13. Top-speed adjustment
14. Plugging, fine adjustment
15. Plugging, coarse adjustment
16. Current-limit adjustment
17. 1A timer adjustment
18. Plugging sensor

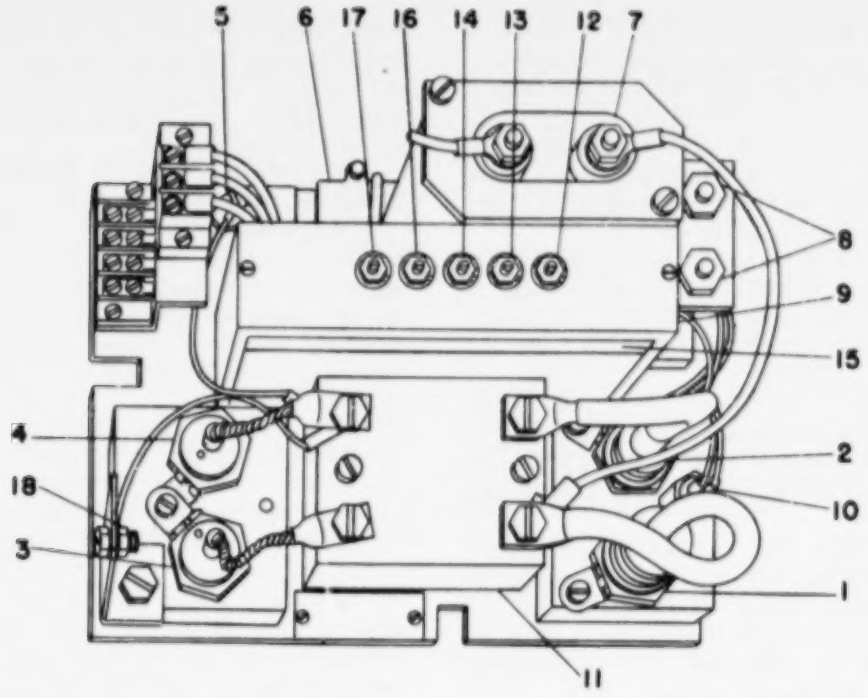

Figure 3-5. SCR control panel, disassembly or reassembly and adjustment.

a. Removal. Refer to paragraph 2-11.

b. Disassembly. Disassembly of the SCR control panel is limited to the removal for testing and replacement of certain components. Replace all components found defective.

(1) Remove 1, 2, 3, 4 and 5 REC (1, 2, 3, 4, 5, fig. 3-5) by disconnecting leads on each and unscrewing from heat sink.

(2) Remove current limiting reactor (6) by removing two attaching screws.

(3) Remove commutating capacitor 1C (7) by disconnecting two electrical leads and removing two long screws from capacitor bracket. Lift off bracket and capacitor.

(4) Remove control circuit fuses (8) by twisting and withdrawing fuse from fuse holder.

(5) Remove oscillator card 1 (9) by loosening two screws from bottom of box and pulling box straight up to disengage from receptacle.

(6) Remove thermal protector (10) by withdrawing both electrical leads and unscrewing from heat sink.

(7) Remove pulse transformer 1T (11) by disconnecting electrical leads and removing two attaching screws.

c. Component Tests.

(1) *SCR's 1REC (1), 2 REC (2) and 5 REC (5).* Construct a test circuit by connecting one lead from a three-volt lamp to the negative terminal of a three-volt flashlight battery.

(a) Connect the positive terminal of the battery to the stud of the REC and the lamp to the pigtail. The lamp should not light. If the lamp does light, the REC is short-circuited and must be replaced.

(b) If the check under (a) above was satisfactory, test the REC for its ability to be turned on by the gate. Connect the gate to the stud. If the gate is operative the lamp should come on and remain on when the gate is disconnected. If the lamp cannot be lit the REC is open-circuited and must be replaced.

(2) *3 REC (3) and 4 REC (4).* Check these rectifiers with a volt-ohmeter (20,000 ohms per volt), 3 and 4 REC are diodes with 7 to 12 ohms in the conducting direction measured on the RX1 scale, and 50,000 ohms or more in the non-conducting direction, measured on the RX 10,000 scale. Replace a defective diode.

(3) *Commutating capacitor 1C (7).* Measure ohms through the capacitor using the RX 10,000 scale of the volt-ohmmeter. Meter should read zero

ohms and then swing to above 100,000 ohms. If this reading is not obtained, replace capacitor.

(4) *Control circuit fuses (8).* Replace fuses if found defective on test.

(5) *Oscillator card 1 (9).* Conduct the following tests using a volt-ohmmeter. Make connections to card pins with insulated clips. If any test is unsatisfactory, replace card 1.

(a) 5 REC firing circuit. Using the RX100 scale, connect the volt-ohmmeter positive lead to pin 13 and the negative lead to pin 49. Circuit should read 1700 to 2100 ohms. Reverse leads and read infinity.

(b) 2REC firing circuit. Using the RX100 scale, connect the volt-ohmmeter positive lead to pin 21 and the negative lead to pin 25. Circuit should read 1170 to 1430 ohms. Reverse leads and read infinity.

(c) 1A Timer. The 1A timer section of card 1 can be checked out only when it is operating as part of a complete system. If 1A timer does not appear to be operating properly and cannot be adjusted as per subparagraph *g* (5) following to obtain desired operations, replace card 1.

(6) *Thermal protector (10).* Using a volt-ohmmeter, the readings should be approximately 50 ohms terminal to terminal, if at room temperature. Set volt-ohmmeter to highest scale and check pins to ground. Reading should be infinity.

d. Cleaning. Keep terminal boards and other exposed SCR control parts free from dirt and paint which could change the effective resistance between points. The heat sinks for the SCR's and diodes are specially painted to help dissipate heat. Take care that no foreign paint gets on the heat sinks. Use low pressure clean dry air to clean the control. If the control is oily, use a mild detergent solution to wash off the control, then blow completely dry with low pressure air.

e. Reassembly (fig. 3-5).

(1) Position pulse tranformer (11) to SCR control panel and secure in place with two screws. Connect electrical leads.

(2) Screw thermal protector (10) into heat sink and tighten to a snug fit. Insert electrical leads into sockets in thermal protector.

(3) Place the oscillator card 1 (9) into position with the pins engaging the receptacle on the SCR control panel. Secure the card in place by two screws.

(4) Install the control fuses (8) by pressing them into the fuse holders.

(5) Position the commutating capacitor 1C (7) to the panel and secure it in place by two screws and a retaining bracket.

(6) Secure the current limiting reactor in place with two attaching screws.

(7) To install 1, 2, 3, 4 and 5 REC, coat the studs lightly with heat transfer grease, screw them into the proper heat sink. Tighten to a snug fit. It is not necessary that they be torqued to a specified value. Adjust the locking devices properly to prevent loosening.

f. Installation. Refer to paragraph 2-11 and install the SCR control panel.

g. Adjustments (fig. 3-5). The SCR control panel has been factory adjusted to function with the associated components on this forklift truck. No further major adjustment should be necessary. Card 1 provides trimpot adjustments in the "touching range". Make these adjustments as follows:

CAUTION

Do not plug the track when it is jacked up and the drive wheels are in a free wheeling position. This can create excessive voltages that can be harmful to the control.

(1) *Creep speed.* Jack up the track so that the drive wheels are free to rotate. Set the CREEP SPEED trimpot (12) so that, with the accelerator switch in the first position, the speed of the drive axle wheel is 20 to 30 RPM.

CAUTION

In the following, insulate or wrap the jumper connection to wire 29 to prevent accidental contact of this point to the truck frame. If this point touches the truck frame, it will damage the control card.

(2) *Top SCR speed.* Jack up the truck so that the drive wheels are free to rotate. Connect voltmeter between battery positive and T2 (fig. 1-1) on the SCR panel. Insert an ammeter of 300 ampere range in the battery supply circuit. Remove wire 29 from the thermal protector and connect an insulated jumper from wire 29 to the negative (pigtail) of 1 REC (1, fig. 3-5). Short-circuit the brake switch so that power and brakes can be applied at the same time. Check top SCR speed by first moving the accelerator until the F or R contactor operate. Do not move accelerator to the point where contactor 1A picks up. Apply the brakes until the battery current is about 75-80 amperes. Adjust the TOP SCR SPEED trimpot (13) until the voltmeter reads 25 to 32 motor volts. Following the completion of this adjustment, disconnect jumper, voltmeter and ammeter, and reconnect wire 29 on the thermal protector. Remove short-circuit from brake switch.

CAUTION

Do not stall the motor for more than 30 seconds at a time. Allow time for motor cooling between stalls. Do not operate motor at high speeds or plug the motor with wheels jacked up. Do not exceed

200 amperes during the current limit adjustment.

(3) *Current limit.* Jack up the truck so that the drive wheels are free to rotate.
Connect a 300 ampere range ammeter between the truck receptacle and the battery plug. Remove wire 29 and connect an insulated jumper from wire 29 to negative (pigtail) of 1 REC (1, fig. 3-5). Short circuit the brake switch so that power and brakes can be applied at the same time. Turn the CURRENT LIMIT (15) fully counter clockwise and the plugging (14) trimpots fully clockwise. With brake applied, depress the accelerator until F or R contactor operate, but not the 1A contactor. Slowly turn the CURRENT LIMIT (15) trimpot in a clockwise direction until the current reaches 200 amperes. After adjustment is made, disconnect meter and jumper, and reconnect wire 29 to the thermal protector. Remove short-circuit from brake switch. Lower truck and remove jacks.

(4) *Plugging.* With the truck on the ground and operative, set the PLUGGING (14) to mid-range and then set (15) fully counter clockwise. This may make the truck inoperative by cutting off control operation (no pulsing). If this occurs, adjust trimpot (15) clockwise until truck operates. Drive truck forward with full speed (accelerator pedal floored) then move directional switch in reverse direction (pedal still floored) and observe behavior of drive wheels. If plugging is too smooth truck will coast for a long distance. Adjust PLUGGING trimpot (15) in a clockwise direction until desired nominal plugging is obtained so that truck will reverse its direction after three to five feet of travel. Any further adjustments should be made with (14).

(5) *1A timer.* When the accelerator pedal is depressed suddenly to the floor, there should be a time delay before the 1A contactor closes and places the drive motor across the battery. Adjust the 1A TIMER (16, fig. 3-5) for a delay of one to two seconds.

h. Tests.

(1) *Tests for circuit control voltage continuity.*

CAUTION

Do not operate the motor at high speeds or plug the motor with wheels jacked up.

(a) Jack up the truck so that the drive wheels are free to rotate.

(b) With truck in either forward or reverse operation and wire 45 (fig. 1-1) disconnected at SCR terminal board, check for control volts positive at SCR terminal board (wire 41) to negative wire 13. If there is zero voltage at this point, check F or R normally open interlocks and 1A coil for continuity.

(c) With truck in either forward or reverse operation and wire 45 disconnected at SCR terminal board, check for control volts positive at 1 REC heat sink (wire 33) to negative (wire 13). If there is zero voltage at this point, check: F or R power tips, and continuity of wiring from battery positive to 1 REC heat sink.

(d) With truck in either forward or reverse operation and wire 45 disconnected from SCR terminal board, measure approximately 3 volts from wire 29 to negative (wire 13) with accelerator potentiometer near creep speed. Volts will drop to zero as accelerator is moved toward full speed. If readings are not correct, first place a jumper wire between wires 29 and 29A which bypasses the thermal protector. Depress the accelerator and check for the above voltage. If voltage readings are correct, replace the thermal protector (10, fig. 3-5).

(e) If the foregoing tests will produce no voltage change, place a jumper between wires 29A and 13. This bypasses the accelerator and the truck should now run at top SCR speed. If top speed is obtained check accelerator potentiometer. If foregoing tests are unsatisfactory, check as indicated in (2) (*a*) following.

(2) *Test of card and REC's.*

(a) Check 1 REC (1, fig. 3-5) and 2 REC (2) subparagraph *c* above.

(b) Disconnect wire 5A from 3 and 4 REC heat sink and wire 9 from F and R contactors. Reapply power, and if control operates properly, replace card 1.

Section III. DIRECTIONAL CONTROL SWITCH

3-12. General

This is a three-position lever controlled switch mounted on the steering column. It is used to change truck direction of travel. Center position is neutral. Pushing forward on the lever drives the truck forward and pulling backward on the lever causes the truck to run in reverse. The directional control switch has a built in device to bring the switch to neutral position if the operator leaves the seat. The device is triggered by a cable which runs from the brake crank to the trip lever on the switch.

3-13. Removal

Remove the directional control switch (para 2-12).

3-14. Disassembly

Refer to figure 3-6 and disassemble the directional control switch.

KEY to fig. 3-6:

1. Screw, machine (2)
2. Cover
3. Washer, nonmetallic (2)
4. Screw, machine (4)
5. Lockwasher (4)
6. Terminal board
7. Terminal board
8. Spring, helical
9. Contact, elec (2)
10. Bushing, sleeve
11. Screw, cap, socket hd
12. Lockwasher
13. Washer, flat
14. Carrier assembly
15. Nut, hex
16. Lockwasher
17. Washer, flat
18. Trip shaft assembly
19. Lever, trip
20. Spring, helical (2)
21. Screw, machine (2)
22. Lockwasher (2)
23. Retainer, hinge pin (2)
24. Arm assembly (2)
25. Pin, hinge (2)
26. Knob, lever
27. Screw, machine
28. Lockwasher
29. Lever assembly
30. Shaft, operating
31. Housing & bearing assembly

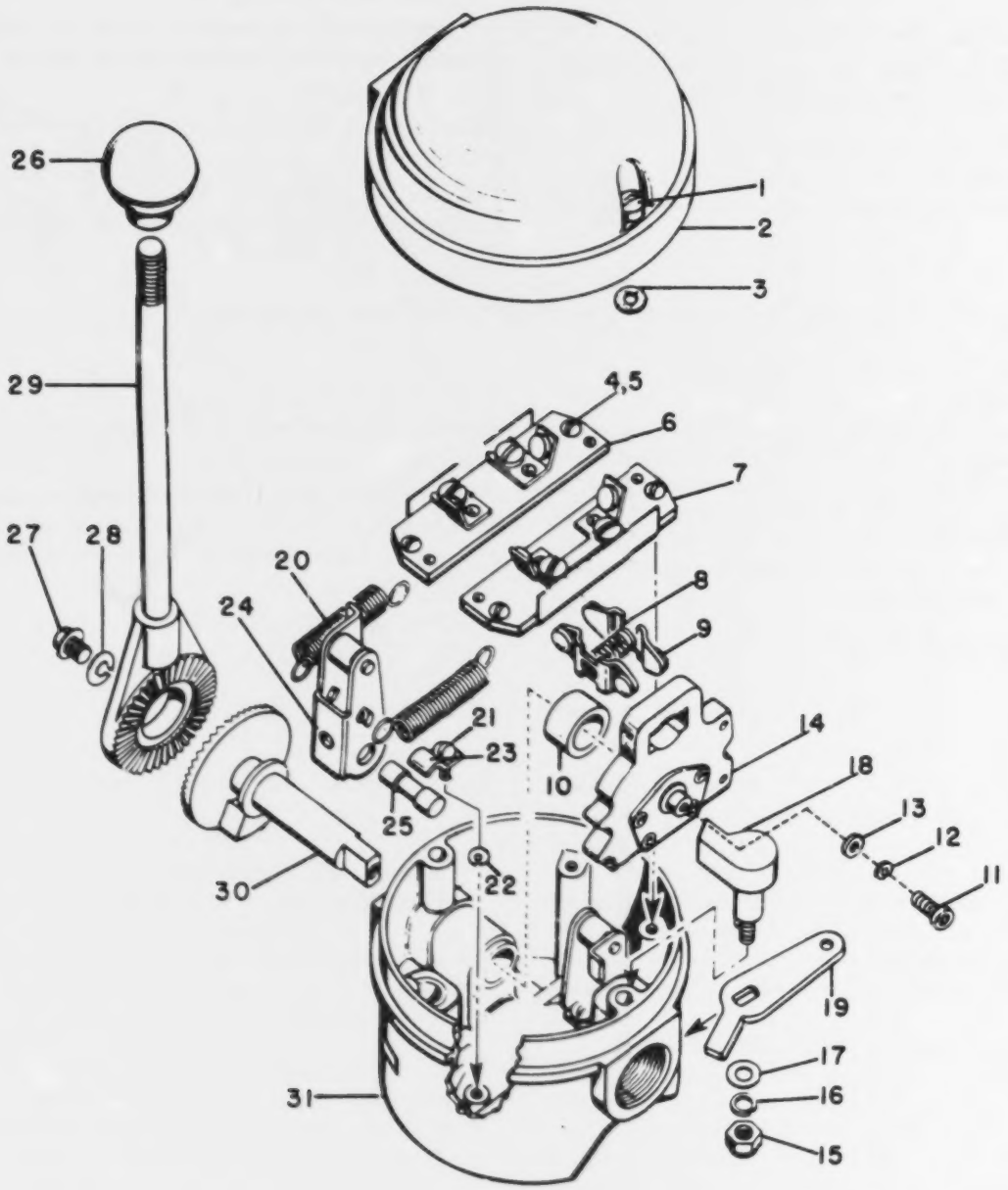

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Figure 3-6. Directional control switch, disassembly or reassembly.

3-15. Cleaning, Inspection and Repair

a. Cleaning. Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection and Repair.

(1) Inspect for breaks, cracks, dents, loose or missing hardware. Inspect springs for weakness or distortion.

(2) Tighten or replace loose or missing mounting hardware. Replace defective parts.

3-16. Reassembly

Refer to figure 3-6 and reassemble the directional control switch.

3-17. Installatio:

Install the directional control switch (para 2-12).

Section IV. ACCELERATOR CONTROL ASSEMBLY

3-18. General

The accelerator control switch is foot-controlled through linkage from the accelerator pedal. The switch, which consists of a potentiometer and a series of cams, controls the drive motor speed. It accomplishes this by varying the SCR output frequency to provide infinitely variable speed control in both directions.

3-19. Removal

Remove accelerator control switch (para 2-10).

3-20. Disassembly

Refer to figure 3-7 and disassemble the accelerator control switch. In removing the individual modules and cams, keep the parts in order to facilitate reassembly.

KEY to fig. 3-7:

1. Screw, cap skt hd (2)
2. Lockwasher (2)
3. Clamp, operating arm
4. Arm, operating
5. Screw, machine (4)
6. Cover assembly
7. Screw, machine (2)
8. Gasket
9. Setscrew
10. Potentiometer assembly
11. Screw, machine (2)
12. Screw, machine (6)
13. Terminal board
14. Insulator, strip
15. Screw, machine (2)
16. Lockwasher (2)
17. Bracket, mounting
18. Screw, R-hd and washer assembly
19. Drive, potentiometer
20. Contact assy, single N.O.
21. Contact assy, double N.O.
22. Marker strip
23. Cam, F-R
24. Cam, SC-FW
25. Detent module
26. Cam, detent
27. Housing, detent module
28. Screw, machine, fl hd (2)
29. Plate, mounting
30. Retainer, shaft
31. Housing, spring return
32. Bearing, shaft (2)
33. Spring, drive (2)
34. Support, spring (2)
35. Spring, return
36. Shaft
37. Enclosure and stop bracket assembly

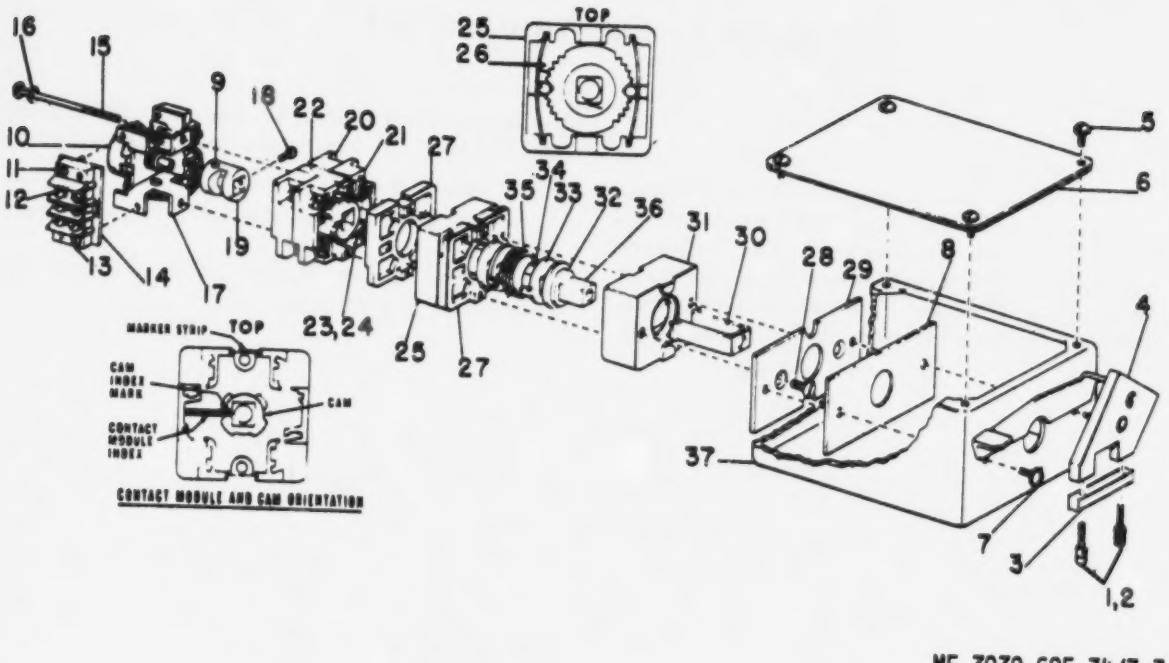


Figure 3-7. Accelerator switch, disassembly or reassembly.

3-21. Cleaning, Inspection, Repair and Overhaul

CAUTION

Switch contacts are silver. Do not file them. Discoloration and slight pitting of the contact is not harmful.

a. Cleaning. Wipe all electrical parts with a dry clean cloth. Clean all other parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection, Repair and Overhaul.

(1) Inspect all wires and terminals for breaks and corrosion. Inspect all other parts for breaks, cracks, dents, loose or missing mounting hardware or other defects.

(2) Inspect contacts, and if worn thin, replace them.

NOTE

When contacts need replacing, replace the contact module as a unit, along with its cam.

(3) Tighten or replace loose or missing mounting hardware as necessary. Replace all defective parts.

3-22. Reassembly

Refer to figure 3-7 and reassemble the accelerator control switch. Observe the following:

a. Cams and contact modules. When reassembling cams and contact modules, make sure they are assembled in that order. Also, make sure the orientation of the index line on the cams and contact modules is the same as indicated in figure 3-7.

b. Potentiometer. Before assembling potentiometer to the accelerator switch, connect a volt-ohmmeter across the center and end terminals of the potentiometer. Set volt-ohmmeter scale to RX100. Adjust potentiometer for maximum resistance (approx. 6000 ohms). Install potentiometer, making sure that tab on side is in the notch in bracket, and tighten allen set screw. Recheck potentiometer adjustment. The potentiometer should show maximum resistance when in the neutral position.

3-23. Installation

Install the accelerator control (para 2-10).

Section V. ELECTRIC MOTORS

3-24. General

The drive motor installed in the forklift truck is direct current four pole with a series series winding. The drive motors for the 100-inch lift truck and the 180-inch lift truck are identical. The hydraulic pump motors, while direct current four pole series winding, differ from the drive motors. In addition there is a difference between the hydraulic pump motors on the 100-inch lift and the 180-inch lift; the 180-inch lift having a more powerful motor.

3-25. Drive Motor

a. Removal. Remove the drive motor (para 2-18).

b. Disassembly. Refer to figure 3-8 and disassemble the drive motor.

KEY to fig. 3-8:

1. Screw
2. Cover (half)
3. Cover (half) with nut
4. Pin, cover (4)
5. Screw, machine (4)
6. Lockwasher (4)
7. Connector (long)
8. Connector (long)
9. Bushing & stud assy (2)
10. Nut, plain, hex (4)
11. Lockwasher (4)
12. Washer, flat (4)
13. Bolt, hex-hd
14. Connector (short)
15. Connector, cross (2)
16. Screw, machine (4)
17. Lockwasher (4)
18. Yoke & bearing support
19. Screw, machine (4)
20. Lockwasher (4)
21. Washer, flat (4)
22. Yoke and holder
23. Screw, machine (4)
24. Lockwasher (4)
25. Brush, electrical (4)
26. Spring, torsion (8)
27. Bolt, hex-hd (8)
28. Lockwasher (8)
29. Bracket, bearing
30. Bearing, ball
31. Bearing, ball
32. Armature (complete)
33. Locknut
34. Commutator
35. Coils, armature
36. Key
37. Shaft
38. Screw, flat hd (8)
39. Pole, main (4)
40. Coils, field
41. Terminal coil to stud (3)
42. Bushing & stud assembly (3)
43. Nut, plain, hex (6)
44. Lockwasher (6)
45. Washer, flat (6)
46. Screw (3)
47. Frame, motor

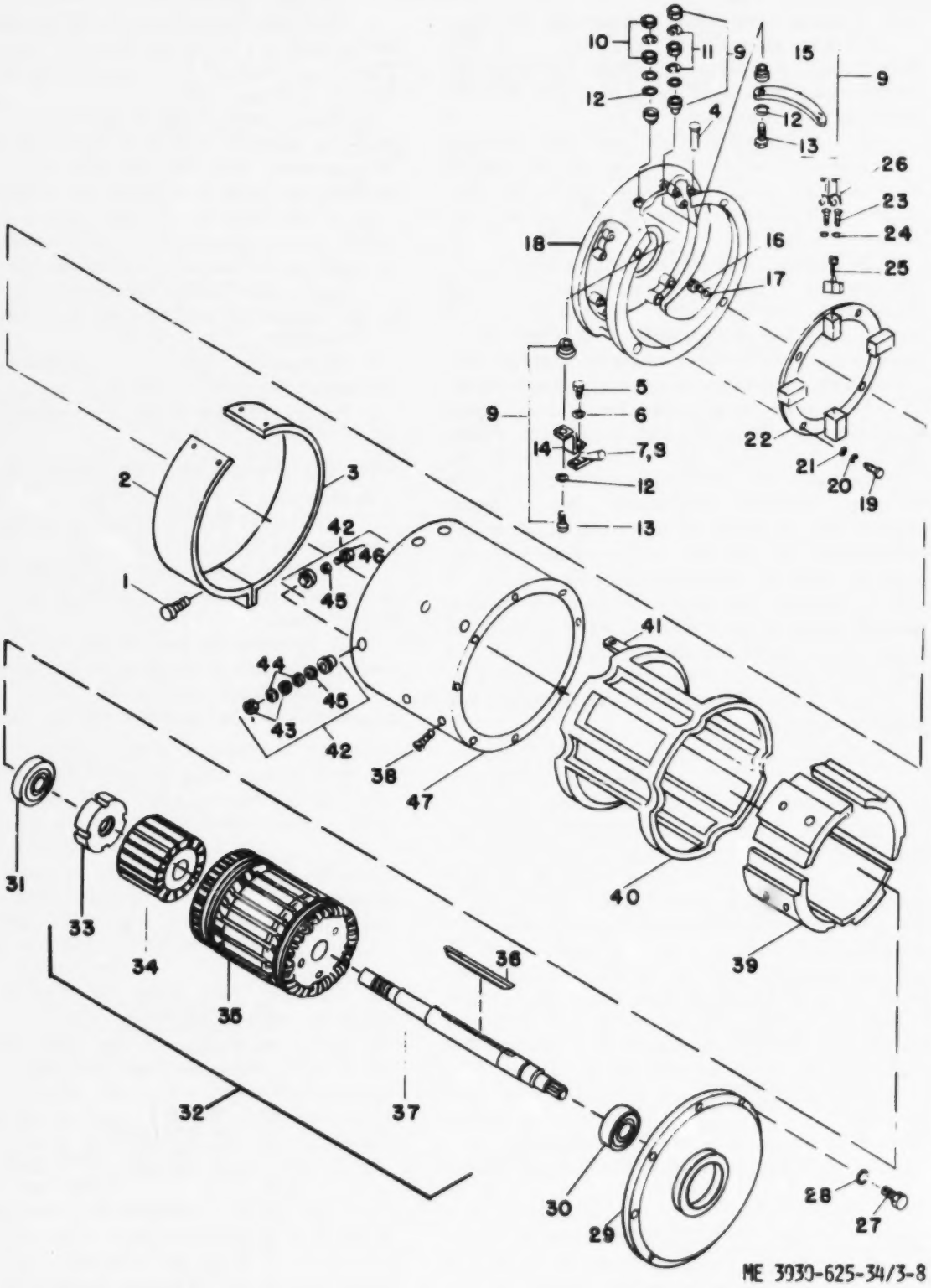


Figure 3-8. Drive motor, disassembly or reassembly.

c. Cleaning, Inspection, Repair and Overhaul.

(1) Wipe all electrical parts with a clean dry cloth. Clean all other parts, except ball bearings, with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

(2) Bearings are single row ball bearings lubricated and sealed for life. Inspect the bearing for sticking, looseness, defective seals and roughness in rotation. Replace bearings that show defects or damage.

(3) Inspect all wires and terminals for damaged or frayed insulation, broken terminal connections and corrosion. Rebraze loose terminals, tape frayed insulation with Class F insulation tape, and remove corrosion. Replace any wire showing extensive damage or deterioration.

(4) Inspect commutator for burns, rough spots, scoring, pitting and high mica. Take a light cut from the commutator with a lathe if the irregularities of the commutator surface are 0.030 in. deep. Undercut commutator mica to depth equal to the thickness of the mica. Replace the commutator if diameter is less than 4½ in. diameter (nominal diameter 5⅛ in.).

(5) Inspect the brush holders for proper spring tension (2.5 lbs). Replace weak or distorted springs. If brushes are shorter than 13/16 in., replace them and seat them with No. 00 sandpaper to provide maximum contact. Clean with dry, low pressure compressed air.

(6) Inspect all other parts for breaks, cracks, dents, loose or missing hardware or other defects. Tighten or replace loose or missing hardware. Replace damaged parts.

d. Motor Testing. Using a multimeter, touch the probes to each end of the field coil terminals to test for continuity. Test for grounded field coils by touching one probe to the field coil circuit and the other to the field core frame. If lack of circuit continuity or a grounded coil is indicated, replace the entire set of field coils. Touch one test probe to each commutator bar and the other to the armature core. If a grounded armature coil is evident, replace the armature.

e. Reassembly. Refer to figure 3-7 and reassemble the drive motor.

f. Installation. Install the drive motor (para 2-18).

3.26. Hydraulic Pump Motor, 100-in. Lift

a. Removal.

(1) Remove the hydraulic pump and motor from the forklift truck (para 2-26).

(2) Using access port in coupling housing, remove snap ring and pin from chain coupling, and lift out chain.

(3) Remove the two flange bolts and lockwashers. Pull the pump away from the motor.

b. Disassembly. Refer to figure 3-9 and disassemble the pump motor for the 100-in. lift.

KEY to fig. 3-9:

1. Screw, pan hd
2. Cover
3. Screw, machine (4)
4. Connector
5. Connector
6. Connector
7. Spring (8)
8. Brush (4)
9. Screw, machine (4)
10. Lockwasher (4)
11. Foot (2)
12. Yoke & bearing support
13. Screw, rd hd (4)
14. Lockwasher (4)
15. Washer, flat (4)
16. Yoke & holder assembly
17. Bearing, ball
18. Setscrew
19. Sprocket, driving half
20. Key
21. Screw, machine (4)
22. Lockwasher (4)
23. Endshield (drive end)
24. Bearing, ball, drive end
25. Armature, wound, complete
26. Nut
27. Commutator
28. Key, commutator
29. Coils, armature
30. Key, armature
31. Shaft
32. Screw, machine (8)
33. Main pole (4)
34. Field coil (1 set)
35. Terminal
36. Stud & bushing assy (2)
37. Nut, plain, hex (4)
38. Lockwasher (4)
39. Washer, flat (4)
40. Bushing assembly (2)
41. Screw, machine (2)
42. Frame

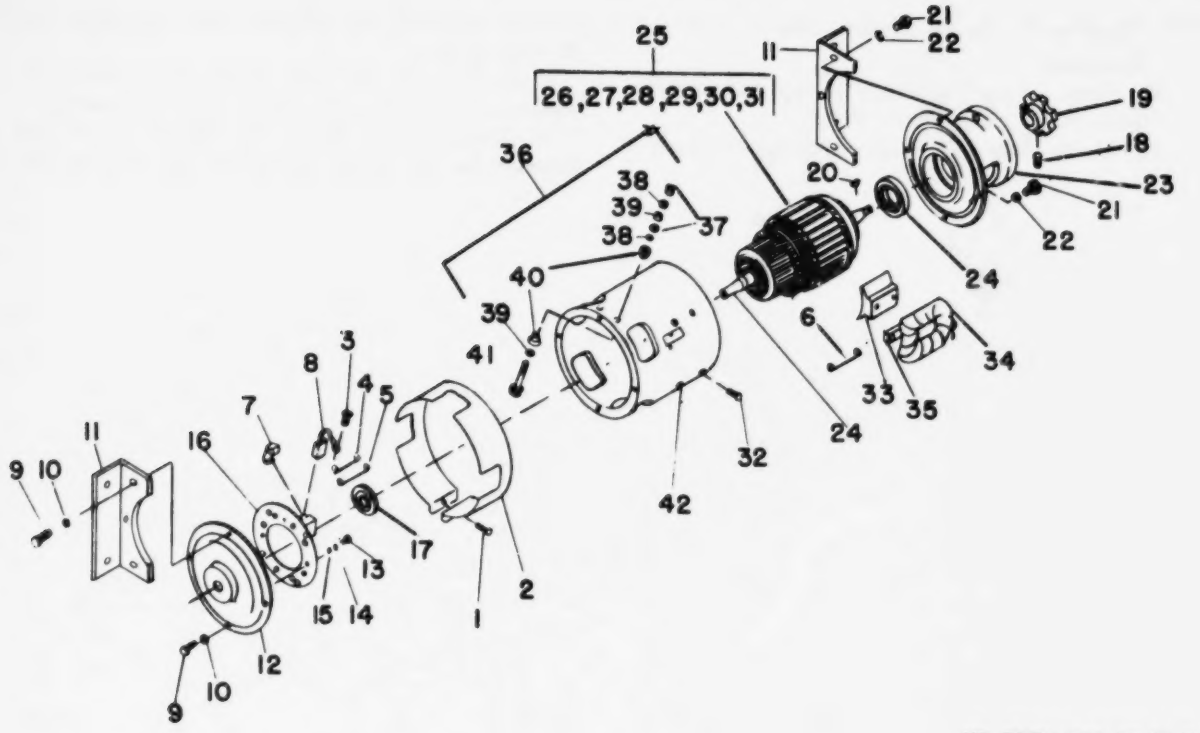


Figure 3-9. Hydraulic pump motor, 100-inch lift, disassembly or reassembly.

c. Cleaning, Inspection, Repair and Overhaul.

(1) Wipe all electrical parts with a clean dry cloth. Clean all other parts, except ball bearings with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

(2) Bearings are single row ball bearings lubricated and sealed for life. Inspect the bearing for sticking, looseness, defective seals and roughness in rotation. Replace bearings that are defective or damaged.

(3) Inspect all wires and terminals for damaged or frayed insulation, broken terminal connections and corrosion. Rebraze loose terminals, tape frayed insulation with Class F insulation tape, and remove corrosion. Replace any wire showing extensive damage or deterioration.

(4) Inspect commutator for burns, rough spots, scoring, pitting and high mica. Take a light cut from the commutator in a lathe if the irregularities of the commutator surface are 0.030 in. deep. Undercut commutator mica to a depth equal to the thickness of the mica.

(5) Inspect the brush holders for proper spring tension (2.5 lbs). Replace weak or distorted springs. If brushes show excessive wear replace them and seat them with No.00 sandpaper to provide maximum contact. Clean with dry, low pressure compressed air.

(6) Inspect all other parts for breaks, cracks, dents, loose or missing hardware or other defects. Tighten or replace loose or missing hardware. Replace damaged parts.

d. Motor Testing. Using a multimeter, touch the probes to each end of the field coil terminals to test for continuity. Test for grounded field coils by touching one probe to the field coil circuit and the other to the field core frame. If lack of circuit continuity or a grounded coil is indicated, replace the entire set of field coils. Touch one test probe to each commutator bar and the other to the armature core. If a grounded armature coil is evidenced, replace the armature.

e. Reassembly. Refer to figure 3-9 and reassemble the hydraulic pump motor for the 100-in. lift.

f. Installation.

(1) Position the pump to the motor and secure in place with two flange bolts and lockwashers.

(2) Install the coupling chain on the two coupling sprockets.

(3) Install the hydraulic pump and motor in the forklift truck (para 2-26).

3-27. Hydraulic Pump Motor, 180-in. Lift

a. Removal.

(1) Remove the hydraulic pump and motor from the forklift truck (para 2-26).

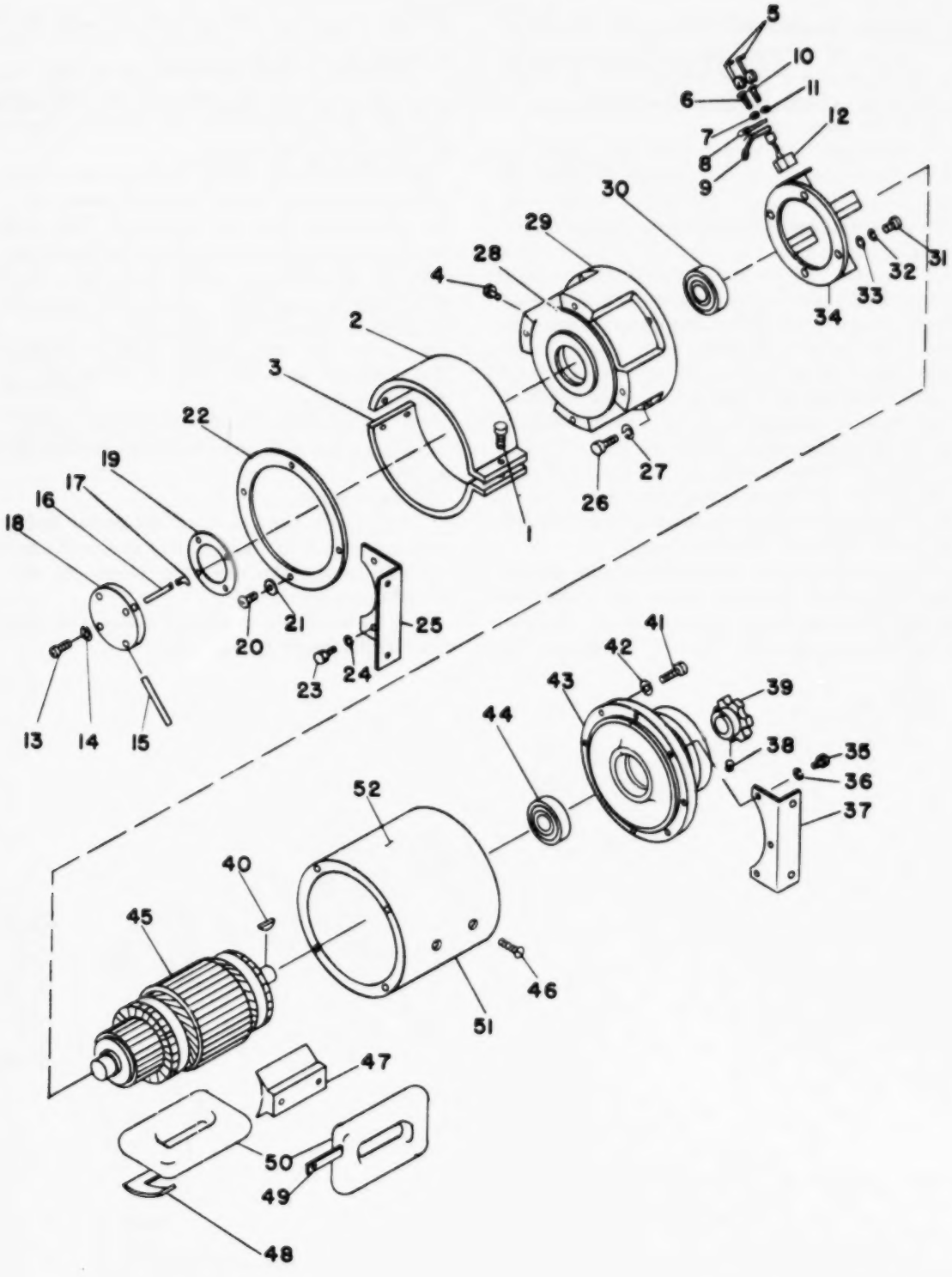
(2) Using access port in coupling housing, remove snap ring and pin from chain coupling, and lift out chain.

(3) Remove the two flange bolts and lockwashers. Pull the pump away from the motor.

b. Disassembly. Refer to figure 3-10 and disassemble the pump motor for the 180-in. lift.

KEY to fig. 3-10:

1. Screw, machine
2. Cover (half)
3. Cover (half) (w/nut)
4. Pin, headed (4)
5. Spring, torsion (8)
6. Screw, R hd (4)
7. Lockwasher (4)
8. Conn, cross (2)
9. Conn, stud to brush
10. Screw, R hd (4)
11. Lockwasher (4)
12. Brush (4)
13. Screw, pan hd (4)
14. Lockwasher (4)
15. Grease relief pipe
16. Grease pipe
17. Alemite fitting
18. Cap, end
19. Plate, metering
20. Screw, R hd (4)
21. Lockwasher (4)
22. Ring, enclosing
23. Screw (3)
24. Lockwasher (3)
25. Foot, front end
26. Screw, hex (4)
27. Lockwasher (4)
28. Support, yoke & bearing
29. Bushing & stud assembly
30. Bearing, ball
31. Screw, R hd (4)
32. Lockwasher (4)
33. Washer, flat (4)
34. Holder assy, yoke
35. Screw (3)
36. Lockwasher (3)
37. Foot, drive end
38. Set screw
39. Sprocket, driving half
40. Key
41. Screw, hex-hd (5)
42. Lockwasher (5)
43. Bracket, brg
44. Bearing, ball
45. Armature (complete)
46. Screw, hex-hd (8)
47. Pole, main (4)
48. Terminal, field coil to stud
49. Terminal, coil to brush holder
50. Coil, field
51. Bushing assy, stud
52. Frame



ME 3930-625-34/3-10

Figure 3-10. Hydraulic pump motor, 180-inch lift, disassembly or reassembly.

c. Cleaning, Inspection, Repair and Overhaul.

(1) Wipe all electrical parts with a clean dry cloth. Clean all other parts, except ball bearings with cleaning solvent (Federal Specificaion P-D-680) and dry thoroughly.

(2) Bearings are single row ball bearings lubricated and sealed for life. Inspect the bearing for sticking, looseness, defective seals and roughness in rotation. Replace bearings that are defective or damaged.

(3) Inspect all wires and terminals for damaged or frayed insulation, broken terminal connections and corrosion. Rebraze loose terminals, tape frayed insulation with Class F insulation tape and remove corrosion. Replace any wire showing extensive damage or deterioration.

(4) Inspect commutator for burns, rough spots, scoring, pitting and high mica. Take a light cut from the commutator in a lathe if the irregularities of the commutator surface are 0.030 in. deep. Undercut commutator mica to a depth equal to the thickness of the mica.

(5) Inspect the brush holders for proper spring tension (2.5 lbs). Replace weak or distorted springs. If brushes show excessive wear replace them and seat them with No. 00 sandpaper to provide maximum contact. Clean with dry, low pressure compressed air.

(6) Inspect all other parts for breaks, cracks, dents, loose or missing hardware or other defects. Tighten or replace loose or missing hardware. Replace damaged parts.

d. Motor Testing. Using a multimeter, touch the probes to each end of the field coil terminals to test for continuity. Test for grounded field coils by touching one probe to the field coil circuit and the other to the field core frame. If lack of circuit continuity or a grounded coil is indicated, replace the field coils. Touch one test probe to each commutator bar and the other to the armature core. If a grounded armature coil is evidenced, replace the armature.

e. Reassembly. Refer to figure 3-10 and reassemble the hydraulic pump motor for the 180-in. lift.

f. Installation.

(1) Position the pump to the motor and secure in place with two flange bolts and lockwashers.

(2) Install the coupling chain on the two coupling sprockets.

(3) Install the hydraulic pump and motor in the forklift truck (para 2-26).

CHAPTER 4

REPAIR OF HYDRAULIC LIFT COMPONENTS

Section I. HYDRAULIC PUMP AND COUPLING

4-1. General

The hydraulic pump is a vane type pump. It is mounted on the pump motor, held in place by two bolts that secure the pump coupling housing to the motor frame. The pump and motor shafts are connected by a chain coupling.

4-2. Removal

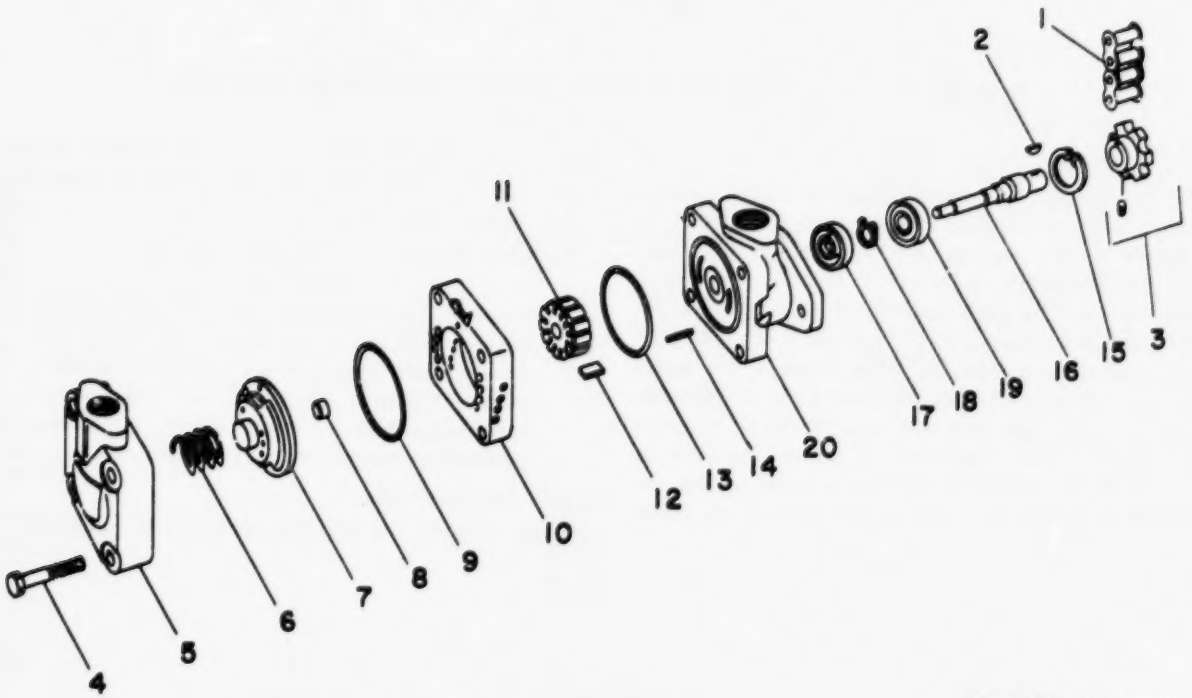
a. Remove the hydraulic pump and motor from the forklift truck (para 2-26).

b. Using access port in coupling housing, remove snap ring and pin from chain coupling, and lift out chain.

c. Remove the two flange bolts and lockwashers. Pull the pump and coupling away from motor.

4-3. Disassembly

Refer to figure 4-1 and disassemble the pump and motor coupling.



ME 3930-625-34/4-1

1. Chain
2. Key
3. Coupling, driven half
4. Screw, hex-hd (4)
5. Cover
6. Spring
7. Plate, pressure
8. Bushing
9. O-Ring
10. Ring
11. Rotor
12. Vane
13. O-Ring
14. Pin (2)
15. Ring, snap
16. Shaft
17. Seal
18. Ring, snap
19. Bearing
20. Body

Figure 4-1. Hydraulic pump and motor coupling, disassembly or reassembly.

4-4. Cleaning, Inspection, Repair and Overhaul

a. Cleaning. Clean all parts with cleaning solvent (Federal Specification P-D-680), and dry thoroughly.

b. Inspection, Repair and Overhaul.

(1) Inspect the wearing surfaces for scoring and excessive wear. Replace any heavily scored or badly worn parts.

(2) Inspect the vanes for burrs, wear and for excessive play while in the rotor slots. Replace the rotor if the slots are worn.

(3) Inspect the seal and bushing mating surfaces on the shaft for scoring or wear. Replace the shaft if marks cannot be removed by light polishing. Replace seals.

(4) Inspect "O" rings between sections. Replace if defective.

(5) Inspect coupling sprocket for broken or damaged teeth, and coupling chain for cracked plates or worn pins. Replace defective coupling and complete coupling chain if defective parts are evident.

CAUTION

When reassembling vanes in rotor, be sure that square edge of vane is seated in rotor slot with sharp edge leading in the direction of rotation. Proper rotation of pump is counter-clockwise when viewed from driven end.

4-5. Reassembly

NOTE

Coat all parts with clean hydraulic fluid to facilitate reassembly and provide initial lubrication.

Refer to figure 4-1 and reassemble the hydraulic pump.

4-6. Installation

a. Position the pump to the motor and secure in place with two flange bolts and lockwashers.

b. Install the coupling chain on the two coupling sprockets and tighten two setscrews.

c. Install the hydraulic pump and motor in the forklift truck (para 2-26).

Section II. HYDRAULIC DIRECTIONAL CONTROL VALVE

4-7. General

The hydraulic directional control valve (stack valve) is located adjacent to the operator's seat. It consists of two separate sections joined together. The sections derive their names from the cylinders they control. The stack valve controls the hydraulic lift, and tilt functions of the forklift truck. It is an open center valve, that is; when none of the ports through which hydraulic oil must flow to perform work are open, the fluid will cycle through the valve and back to the reservoir, if pump pressure is exerted. When either of the two control levers are pushed or pulled, a switch at the base of the stack valve is actuated (para 2-27 *c*). The control valves are self centering when manual effort is removed.

4-8. Removal

Remove the stack valve (para 2-27).

CAUTION

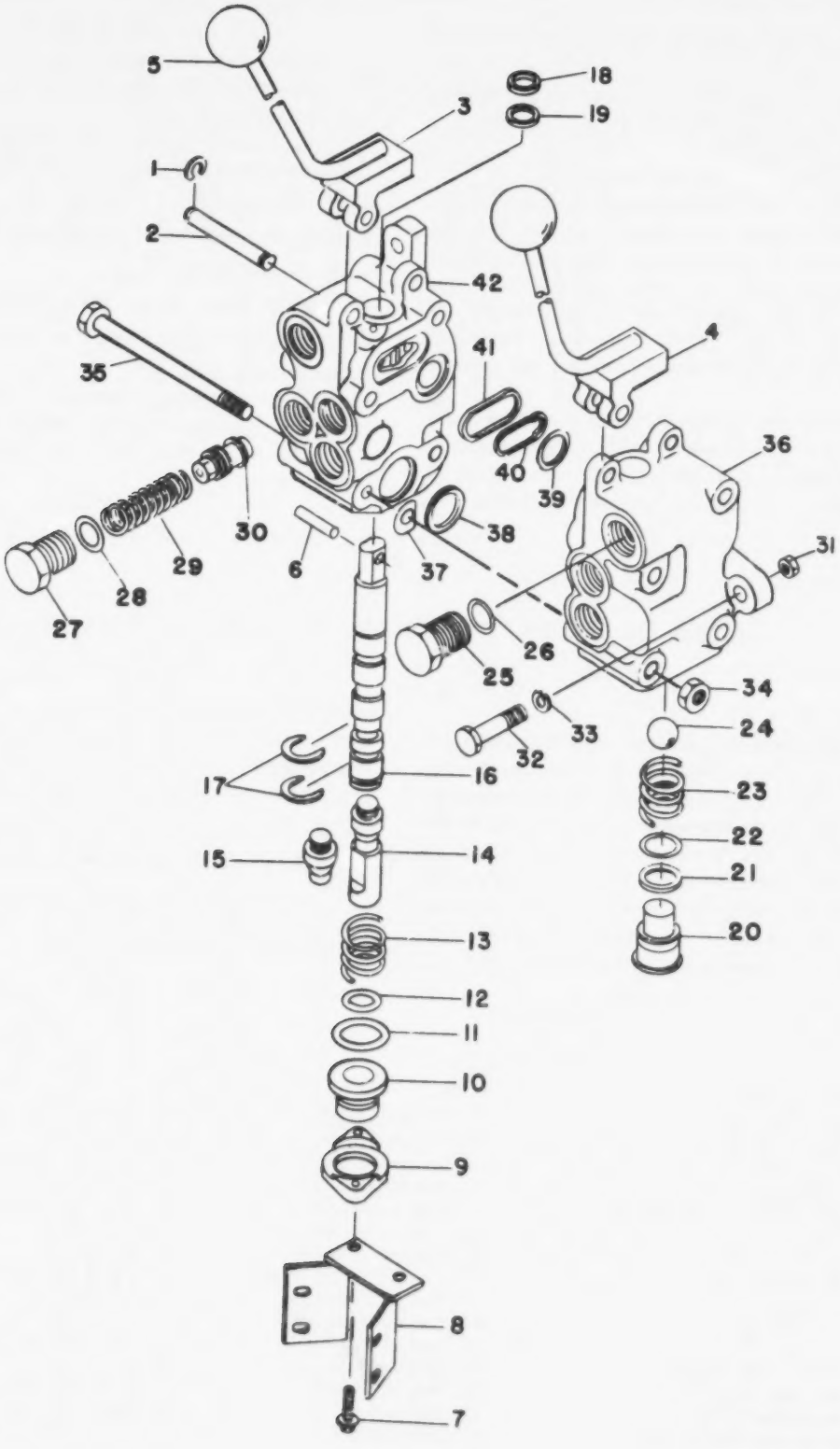
During disassembly, identify all parts removed from a particular section, to ensure that the parts are returned to the same section. Spools are not interchangeable. Entire valve section, including spool, must be replaced.

4-9. Disassembly

Refer to figure 4-2 and disassemble the stack valve.

KEY to fig. 4-2:

1. Washer "E" (2)
2. Rod
3. Handle, lift
4. Handle, tilt
5. Knob (2 reqd)
6. Pin (2 reqd)
7. Screw, machine (4)
8. Bracket, switch
9. Retainer, spool (2)
10. Sleeve (2)
11. O-Ring (2)
12. Quad ring (2)
13. Spring, ctrg (2)
14. Cam, extension
15. Cam extension
16. Spool (2)
17. C-washer (4)
18. Ring, back-up (2)
19. Quad ring (2)
20. Plug (2)
21. Ring, backup (2
22. O-Ring (2)
23. Spring (2)
24. Ball (2)
25. Plug
26. O-Ring
27. Plug
28. O-Ring
29. Spring
30. Sub-assy, cont. v
31. Nut
32. Screw, machine (3)
33. Lockwasher (3)
34. Nut, plain, hex (4)
35. Screw, machine (4)
36. Outlet section
37. Shim (4)
38. Seal
39. Seal
40. Retainer
41. Seal
42. Inlet section



ME 3930-625-34/4-2

Figure 4-2. Hydraulic directional control (stack) valve, disassembly or reassembly.

4-10. Cleaning, Inspection, Repair and Overhaul

a. Cleaning. Clean all parts with dry cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection, Repair and Overhaul.

(1) Inspect the valve bores and spools for grooves, deep scratches or excessive wear. Be sure that each spool fits its respective bore with a slight hand pressure and without preceptible side clearance. If the spools are loose, scored or damaged, or if the valve body has damaged threads, cracks or scored bores, replace the control valve.

(2) Inspect the seating faces in the valve body for defects which could cause leakage. If external or internal leakage (oil bleeds back to reservoir) occurs, replace the leaking section, including the spool.

CAUTION

Plastic cams at ends of spools cannot be reinserted. If cams have been pulled out, replace them.

(3) Inspect springs for breaks or distortion. Replace damaged, distorted or weak springs.

4-11. Reassembly

Refer to figure 4-2 and reassemble the stack valve.

4-12. Installation

Install the stack valve (para 2-27).

4-13. Relief Valve Pressure Test

Remove the plug (10, fig. 2-15) at valve inlet connection. Connect a suitable pressure gauge and check the reading. If gauge indication is more than 1750 PSI or less than 1650 PSI, replace relief valve insert (9).

WARNING

Do not attempt repairs to relief valve.

Section III. HYDRAULIC MAST COLUMN ASSEMBLY

4-14. General

The hydraulic mast column assembly handles all of the lifting, tilting, depositing and retrieving operations. The major components of this assembly are the mast and carriage assemblies and the carriage lift chains. While performing the same functions, the hydraulic mast columns of the 100-inch lift and the 180-inch lift trucks are dissimilar. Except for the cylinder crosshead side block and the carriage roller assemblies, the parts of the two masts are not interchangeable. The following paragraphs provide separate instructions for the repair and maintenance of the masts for the 100-inch and the 180-inch forklift trucks.

4-15. Hydraulic Mast Column for 100-Inch Lift

a. Removal. Remove the mast column (para 2-22).

b. Disassembly. Refer to figure 4-3 and disassemble the mast column.

KEY to fig. 4-3:

1. Cotter pin (4)
2. Mast pivot pin (2)
3. Bolt, hex-hd (4)
4. Lockwasher (4)
5. Load back rest carriage assembly
6. Fork (2)
7. Pin, cotter (8)
8. Pin, chain block
9. Chain, leaf (2)
10. Nut, jam (2)
11. Nut, hex (2)
12. Chain, block, adj. (2)
13. Nut, jam, steel (2)
14. Lockwasher (2)
15. Screw, cap, hex-hd (2)
16. Mast first stage
17. Screw, machine
18. Plate, clamp
19. Pin, latch (2)
20. Latch, cylinder crosshead
21. Latch, carriage
22. Carriage
23. Screw (special)
24. Set screw (4)
25. Set screw, dog face (4)
26. Side bearing (4)
27. Disc backup (4)
28. Dust cover, roller (4)
29. Bearing, roller (4)
30. Race, inner (4) reqd)
31. Washer, thrust (4)
32. Screw, socket hd (2)
33. Lockwasher (2)
34. Yoke, cylinder
35. Bolt, socket hd (4)
36. Slide block
37. Slide block
38. Shim set
39. Pin, cotter (4)
40. Pin, idler bearing (2)
41. Idler, ball bearing (2)
42. Bolt, modified
43. Lockwasher
44. Cylinder, lift
45. Flow control valve
46. Elbow, 45°
47. Thimble, flow control valve
48. Spring, compression
49. Disc, flow control valve
50. Valve body
51. O-Ring
52. Screw, hex-hd (2)
53. Nut, hex (2)
54. Lockwasher (2)
55. Latch trip assy, stat. mast
56. Plug, pipe (16)
57. Side thrust button (6)
58. Screw, flat head (8)
59. Pad, bearing (4)
60. Shim (4)
61. Mast, fixed, 100 in.
62. Latch assembly
63. Pin
64. Clip
65. Pin
66. Spring

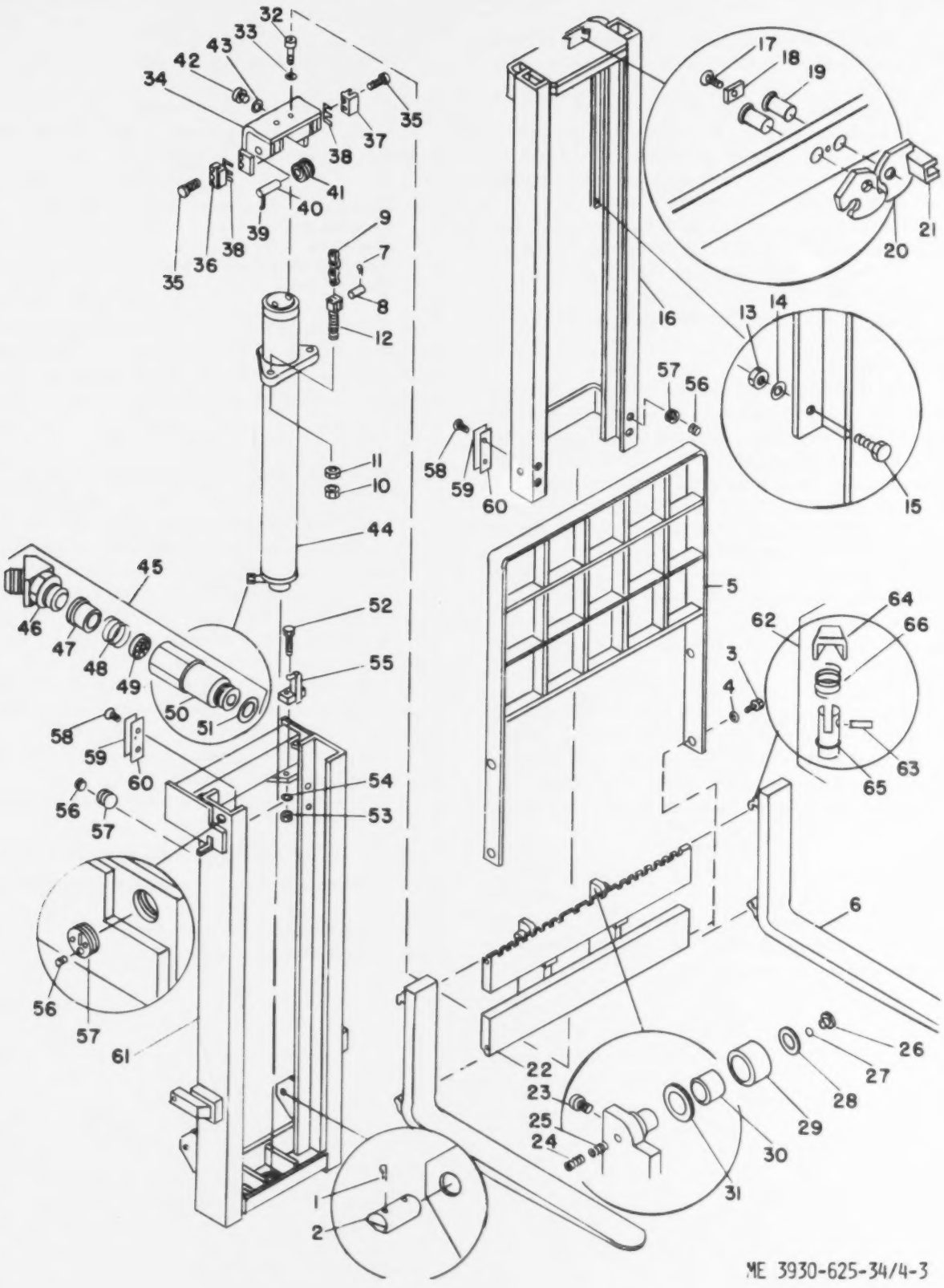


Figure 4-3. Hydraulic mast column, 100-inch lift, disassembly or reassembly.

c. Cleaning. Wash all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

d. Inspection and Repair.

(1) Inspect all parts for scores, breaks, cracks, bends and loose or missing hardware. Tighten or replace loose or missing hardware, and replace damaged or defective parts as necessary.

(2) Inspect the pin assemblies for wear and other damage. Replace worn or damaged pins.

(3) Inspect ball bearings for rough spots or excessive play. Replace if defective.

(4) Inspect roller ring for cracks and wear. If diameter is smaller than 2.718 inch, replace the roller ring.

(5) Inspect side buttons for clearance between button and mast channel. If clearance exceeds 0.0625 inch, adjust by loosening pipe plug (56, fig. 4-3) and rotating button (57) in threads until desired clearance is obtained. Retighten pipe plug. Normal clearance is between 0.032 inch and 0.0625 inch. Minimum collar thickness of button 0.0625 inch. Replace button if smaller.

(6) Inspect front and rear mast bearing pads and check clearances. These are normally 0.032 inch to 0.0625 inch front and rear. Replace 0.125 inch thick bearing pad if metal thickness is less than 0.090 inch.

(7) Inspect mast side bearing and check clearances. These are normally 0.032 inch to 0.0625 inch. Replace 0.125 inch bearing pads if metal thickness is less than 0.090 inch. Replace 0.625 inch bearing pads if metal thickness is less than 0.500 inch. Adjust bearing position by means of set screw (25, fig. 4-3).

CAUTION

Adjusting screw has nylock insert. Do not remove insert.

(8) Check telescoping mast for channel wear. If opening exceeds 2.855 inch, replace channel or install oversize rollers.

WARNING

Do not attempt any repairs to a link chain.

(9) Inspect leaf chain for:

(a) Cracked side plates. If one cracked plate is found, replace both chains.

NOTE

Checking for cracked plates requires a close visual inspection after carefully cleaning the chain. Most cracks occur at the pitch holes and run out to the edge of the side plates at an angle perpendicular to the pitch line.

(b) Elongation due to wear. Inspect that portion of the chain which flexes over the chain rollers for joint wear. If check indicates considerable elongation due to wear, replace both chains.

NOTE

Elongation due to wear is most easily checked while the chain is on the truck.

(c) Tight joints. Inspect the chain for bent pins, bent plates or peened over plate edges which will result in tight joints. If tight joints are evident, attempt to remove them by applying cleaning solvent (Federal Specification P-D-680) and then flexing the joint. If the tight joint fails to loosen readily, replace both chains.

(10) Inspect chain roller Replace if side guards are broken or if roller bearing has excessive play.

e. Reassembly. Refer to figure 4-3 and reassemble the mast column.

f. Installation. Install the mast column (para 2-22).

4-16. Hydraulic Mast Column for 180-Inch Lift

a. Removal. Remove the mast column (para 2-23).

b. Disassembly. Refer to figure 4-4 and disassemble the mast column.

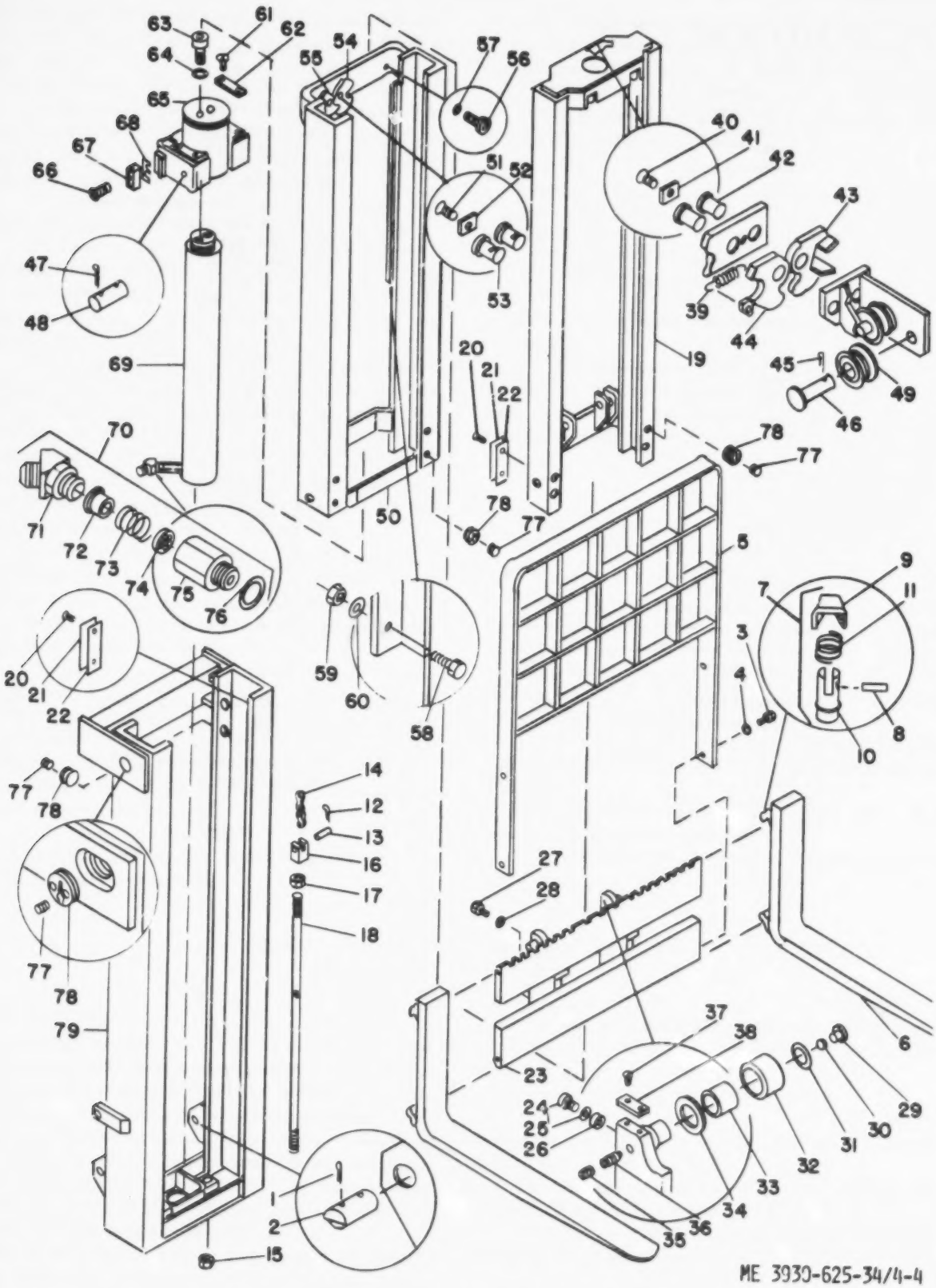


Figure 4-4. Hydraulic mast column, 180-inch lift, disassembly or reassembly.

KEY to fig. 4-4:

1. Cotter pin (4)
2. Mast pivot pin (2)
3. Bolt, hex-hd (4)
4. Lockwasher (4)
5. Back rest
6. Forks (2)
7. Latch assembly
8. Pin
9. Clip
10. Pin
11. Spring
12. Pin, cotter (4)
13. Pin, chain block (4)
14. Chain, leaf (2)
15. Nut, self-lock, hex (2)
16. Clevis (2)
17. Nut, hex (2)
18. Rod (2)
19. Mast, 1st stage
20. Screw, flat hd (18)
21. Pad, bearing (8)
22. Shim, brg pad (12)
23. Carriage
24. Screw (special)
25. Lockwasher
26. Spacer
27. Screw, socket hd
28. Lockwasher
29. Bearing, side (4)
30. Disc, backup (4)
31. Dust cover, roller (4)
32. Bearing, roller (4)
33. Race, inner (4)
34. Washer, thrust (4)
35. Setscrew (4)
36. Setscrew, dogface (4)
37. Screw, flat hd (8)
38. Pad, bumper (4)
39. Spring
40. Screw, flat hd
41. Plate, clamp
42. Stud, latch (2)
43. Latch, left
44. Latch, right
45. Pin, cotter (4)
46. Pin, idler (4)
47. Pin, cotter (8)
48. Pin, idler (4)
49. Idler, ball bearing (4)
50. Mast, 2nd stage
51. Screw, flat hd
52. Plate, clamp
53. Stud, latch (2)
54. Latch, locking
55. Latch, locking
56. Bolt, modified
57. Lockwasher
58. Bolt, hex-hd (2)
59. Nut, jam, hex (2)
60. Lockwasher (2)
61. Screw, flat head (Ref 29)
62. Pad, bumper (Ref 30)
63. Screw, cap, socket hd (2)
64. Lockwasher (2)
65. Cylinder, crosshead
66. Screw, cap, socket hd (4)
67. Slide block (2)
68. Shim set (2)
69. Cylinder, lift
70. Flow control valve assy
71. Elbow, 45°
72. Thimble, flow control valve
73. Spring, compression
74. Disc, flow control valve
75. Body, flow control valve
76. O-Ring
77. Plug, pipe (18)
78. Button, side thrust (18)
79. Mast, fixed stage

c. Cleaning. Wash all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

d. Inspection and Repair.

(1) Inspect all parts for scores, breaks, cracks, bends and loose or missing hardware. Tighten or replace loose or missing hardware, and replace damaged or defective parts as necessary.

(2) Inspect the pin assemblies for wear and other damage. Replace worn or damaged pins.

(3) Inspect ball bearings for rough spots or excessive play. Replace if defective.

(4) Inspect roller ring for cracks and wear. If diameter is smaller than 2.718 inch, replace the roller ring.

(5) Inspect side buttons for clearance between button and mast channel. If clearance exceeds 0.0625 inch, adjust by loosening pipe plug (77, fig. 4-4) and rotating button (78) in threads until desired clearance is obtained. Retighten pipe plug. Normal clearance is between 0.032 inch and 0.0625 inch. Minimum collar thickness of button 0.0625 inch. Replace button if smaller.

(6) Inspect front and rear mast bearing pads and check clearances. These are normally 0.032 inch to 0.0625 inch front and rear. Replace 0.125 inch thick bearing pad if metal thickness is less than 0.090 inch.

(7) Inspect mast side bearings and check clearances. These are normally 0.032 inch to 0.0625 inch. Replace 0.125 inch bearing pads if metal thickness is less than 0.090 inch. Replace 0.625 inch bearing pads if metal thickness is less than 0.500 inch. Adjust bearing position by means of set screw (36, fig. 4-4).

CAUTION

Adjusting screw has nylock insert. Do not remove insert.

(8) Check telescoping mast for channel wear. If opening exceeds 2.855 inch, replace channel or install oversize roliers.

(9) Inspect leaf chain for:

a. Cracked side plates. If one cracked plate is found, replace both chains.

NOTE

Check for cracked plates requires a close visual inspection after carefully cleaning the chain. Most cracks occur at the pitch holes and run out to the edge of the side plates at an angle perpendicular to the pitch line.

WARNING

Do not attempt any repairs to a lift chain.

(b) Elongation due to wear. Inspect that portion of the chain which flexes over the chain rollers for joint wear. If check indicates considerable elongation due to wear, replace both chains.

NOTE

Elongation due to wear is most easily checked while the chain is on the truck.

(c) Tight joints. Inspect the chain for bent pins, bent plates or peened over plate edges which will result in tight joints. If tight joints are evident, attempt to remove them by applying cleaning solvent (Federal Specification P-D-680) and then flexing the joint. If the tight joint fails to loosen readily, replace both chains.

(10) Inspect chain roller. Replace if side guards are broken or if roller bearing has excessive play.

e. Reassembly. Refer to figure 4-3 and reassemble the mast column.

f. Installation. Install the mast column (para 2-22).

Section IV. FLOW-CONTROL VALVE

4-17. General

When being lowered, the weight of the carriage alone causes sufficient reverse pressure to push the hydraulic fluid back through the stack valve into the system. To control the downward speed of the mast, a pressure regulating flow control valve (16, fig. 2-8) is installed in the hydraulic line at the point of attachment to the lift cylinder. The flow control valves for the 100-inch lift and the 180-inch lift trucks are not interchangeable.

4-18. Flow Control Valve, 100-Inch Lift Truck

a. Removal. Remove the flow control valve (TM 10-3930-625-12).

b. Disassembly. Disassemble the flow control valve (fig. 4-3).

c. Cleaning. Wash all parts in cleaning solvent (Federal Specification P-D 680) and dry thoroughly.

d. Inspection, Repair and Overhaul.

(1) Inspect the valve body and 45° elbow fitting for cracks, breaks or other defects. Replace if defective.

(2) Inspect spring for distortion or loss of tension. Replace if defective.

(3) Inspect disc for scratches or evidence of warping. Replace if defective.

NOTE

Disc should be 0.783 inch in diameter and have a center orifice of 0.1660 inch diameter and eight peripheral thru holes of 0.1285 inch diameter.

(4) Inspect thimble or boss or scratches or other damage. Replace if defective.

(5) Replace O -ring.

e. Reassembly. Refer to figure 4-3 and reassemble the flow control valve.

f. Adjustment. Using a feeler gauge, check the clearance between the disc face and seat. Nominal clearance should be 0.032 inch to 0.0625 inch. Adjust the clearance by tightening or loosening the 45° elbow on the valve body. Recheck and adjust until proper clearance is obtained.

g. Installation. Install the flow control valve (TM 10-3930-625-12).

4-19. Flow Control Valve, 180-Inch Lift Truck

a. Removal. Remove the flow control valve (TM 10-3930-625-12).

b. Disassembly. Disassemble the flow control valve (fig. 4-4).

c. Cleaning. Wash all parts in cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

d. Inspection, Repair and Overhaul.

(1) Inspect the valve body and 45° elbow fitting for cracks, breaks or other defects. Replace if defective.

(2) Inspect spring for distortion or loss of tension. Replace if defective.

(3) Inspect disc for scratches or evidence of warping. Replace if defective.

NOTE

Disc should be 0.783 inch in diameter and have a center orifice of 0.1560 inch diameter and eight peripheral thru holes of 0.1285 inch diameter.

(4) Inspect thimble or boss for scratches or other damage. Replace if defective.

(5) Replace O -ring.

e. Reassembly. Refer to figure 4-3 and reassemble the flow control valve.

f. Adjustment. Using a feeler gauge, check the clearance between the disc face and seat. Nominal clearance should be 0.032 inch to 0.0625 inch. Adjust the clearance by tightening or loosening the 45° elbow on the valve body. Recheck and adjust until proper clearance is obtained.

g. Installation. Install the flow control valve (TM 10-3930-625-12).

Section V. HYDRAULIC LIFT CYLINDER

4-20. General

The lift cylinder, a part of the hydraulic system, is controlled by the stack valve which permits oil to flow into the lift cylinder or drain from the cylinder. As a consequence the travel of the lift cylinder piston either raises or lowers the mast and carriage assembly. To control the downward speed of the mast when it is lowered, a flow control valve is installed in the hydraulic line at the cylinder. The hydraulic lift cylinders of the 100-inch lift and the 180-inch lift trucks are dissimilar. The following paragraphs provide separate instructions for the repair and maintenance of the lift cylinders for the 100-inch and the 180-inch forklift trucks.

4-21. Lift Cylinder for 100-Inch Lift

a. Removal. Remove the lift cylinder (para 2-24).

b. Disassembly. Refer to figure 4-5 and disassemble the lift cylinder.

KEY to fig. 4-5:

1. Gland, nut
2. Setscrew
3. Guide, piston
4. Rod, piston
5. Wiper, rod
6. Nut, packing adjusting
7. Rod seals
8. O-Ring
9. Ring, backup
10. Nut, rod packing
11. Wiper, rod
12. Bearing, rod
13. V-packing
14. Bearing, rod
15. Ring, retaining (2)
16. Bearing, rod
17. Rod
18. Housing, cylinder

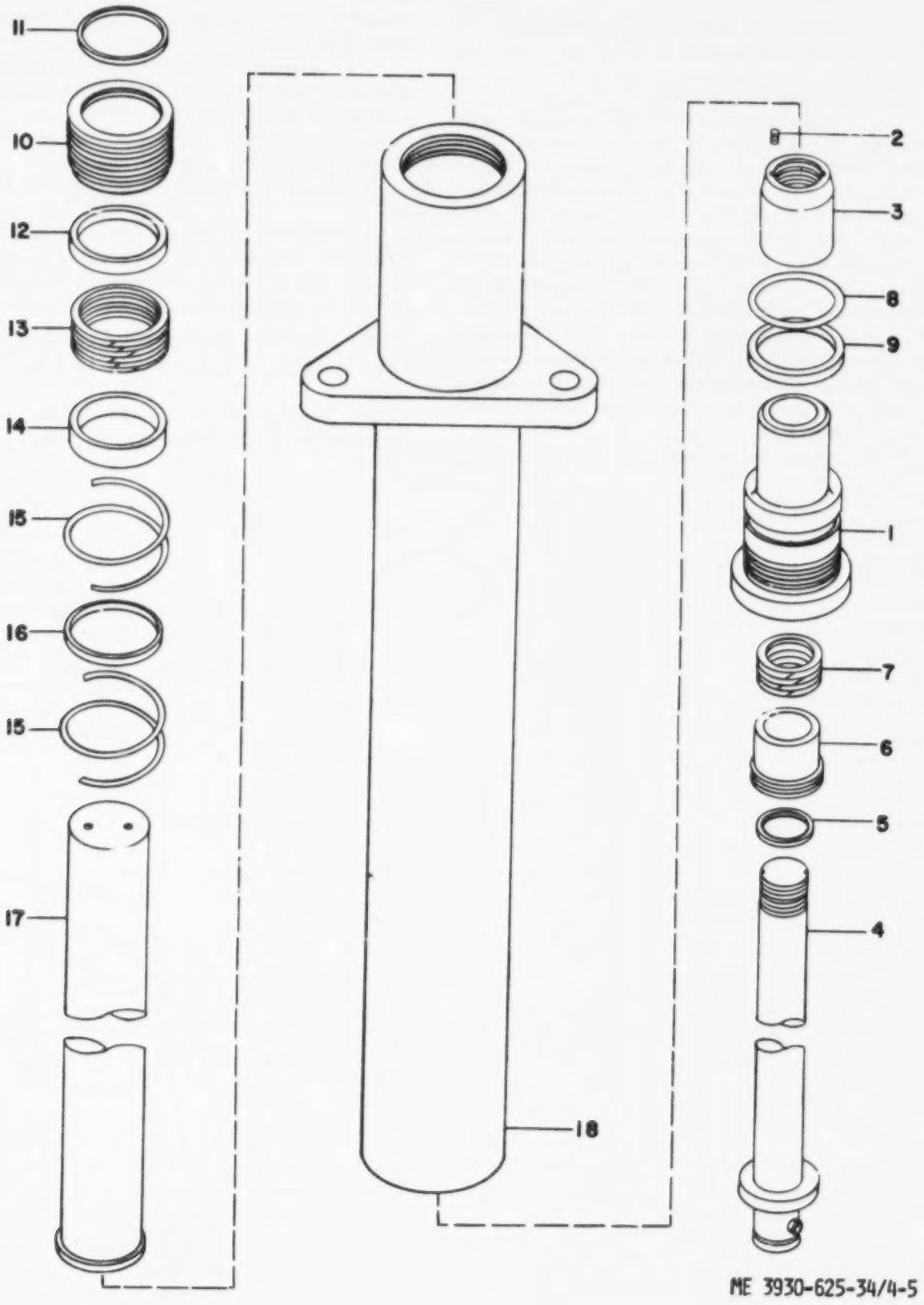


Figure 4-5. Hydraulic lift cylinder, 100-inch lift, disassembly or reassembly.

c. Cleaning. Wash all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

d. Inspection and Repair.

(1) Inspect piston rods for spots of base metal showing through and for pitting. Inspect wiper rings and O-rings for deterioration. Inspect phenolic wear rings for breaks. Check clearances of wear rings and gland bearings. Inspect all other parts for breaks, cracks, bends, and other defects.

(2) Replace piston rods if base metal is visible. Replace or rework piston rods if pitting marks are deeper than 0.020 inch. Replace wiper and O-rings if deteriorated. Replace wear rings if damaged or if clearance between ring and cylinder exceeds 0.020 inch. Replace gland bearings if clearance exceeds 0.015 inch. Replace other parts if defective. Replace seals.

(3) Inspect the cylinder for pitting, scoring, wear or other damage. Replace if damaged or excessively worn.

(4) Inspect the cylinder head, glands and piston rod ends for cracks, stripped threads or other damage. Replace damaged parts.

e. Reassembly. Refer to figure 4-5 and reassemble the lift cylinder.

f. Installation. Install the lift cylinder (para 2-23).

g. Drift Test. Install shut-off valve in hydraulic line to lift cylinder. If drifting exceeds five inches in ten minutes, tighten packing glands. If this does not correct the drifting, replace the "V" packing.

4-22. Lift Cylinder for 180-Inch Lift

a. Removal. Remove the lift cylinder (para 2-25).

b. Disassembly. Refer to figure 4-6 and disassemble the lift cylinder.

KEY to fig. 4-6:

1. Gland nut
2. Wiper
3. Packing
4. O-Ring
5. Ring, backup
6. Housing, cylinder
7. Gland nut
8. Wiper
9. Ring, backup (2)
10. O-Ring
11. Ring, backup
12. O-Ring
13. Ring, backup
14. Rod, piston
15. Valve relief
16. Nipple, pipe
17. V-packing
18. Rod, piston

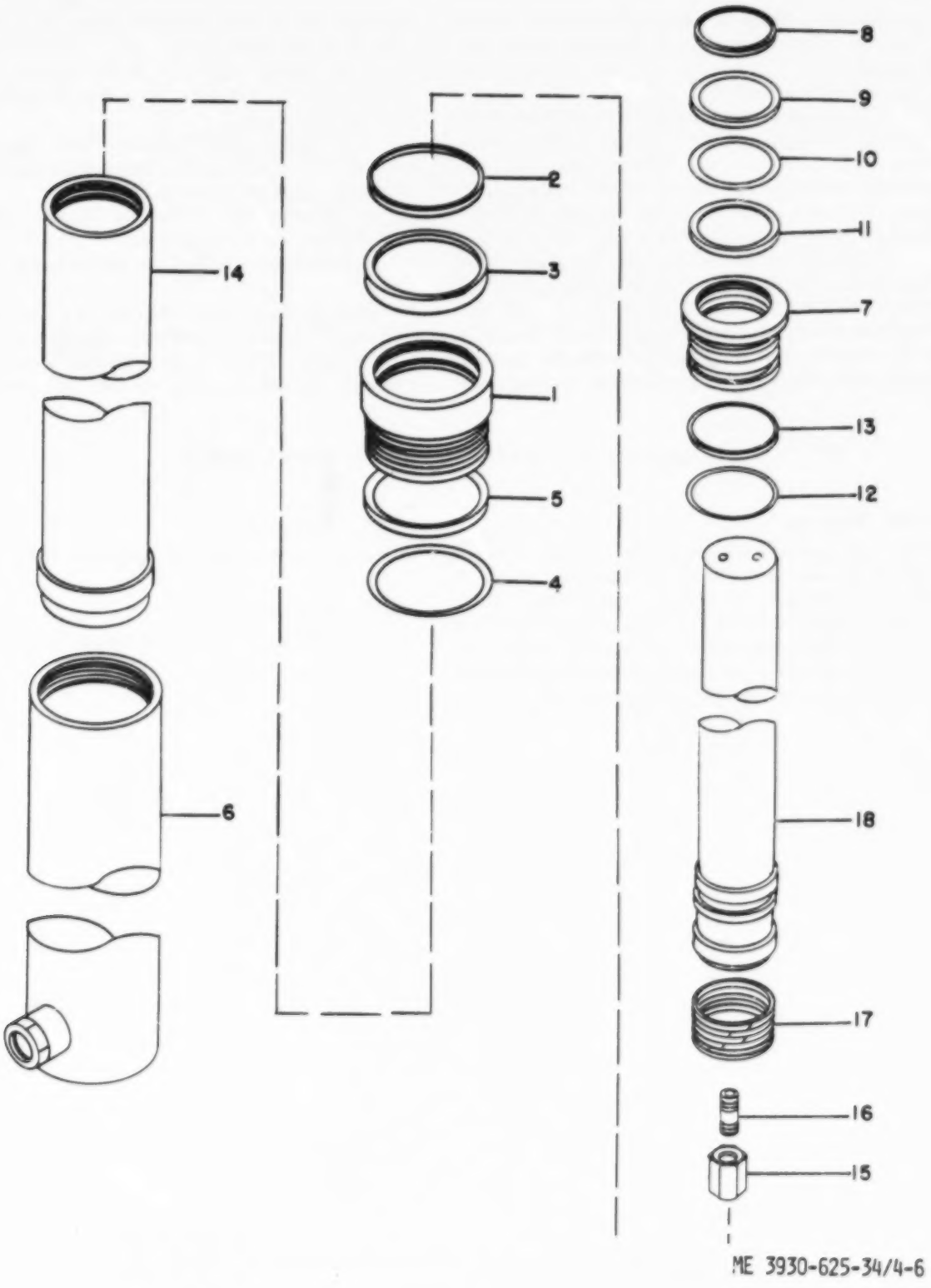


Figure 4-6. Hydraulic lift cylinder, 180-inch lift, disassembly or reassembly.

c. Cleaning. Wash all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

d. Inspection and Repair.

(1) Inspect piston rods for spots of base metal showing through and for pitting. Inspect wiper rings and O-rings for deterioration. Inspect phenolic wear rings for breaks. Check clearances of wear rings and gland bearings. Inspect all other parts for breaks, cracks, bends, and other defects.

(2) Replace piston rods if base metal is visible. Replace or rework piston rods if pitting marks are deeper than 0.020 inch. Replace wiper and O-rings if deteriorated. Replace wear rings if damaged or if clearance between ring and cylinder exceeds 0.020 inch. Replace gland bearings if clearance exceeds 0.015 inch. Replace other parts if defective. Replace seals.

(3) Inspect the cylinder for pitting, scoring, wear or other damage. Replace if damaged or excessively worn.

(4) Inspect the cylinder head, glands and piston rod ends for cracks, stripped threads or other damage. Replace damage parts.

e. Reassembly. Refer to figure 4-6 and reassemble the lift cylinder.

f. Installation. Install the lift cylinder (para 2-24).

g. Drift Test. Install shut-off valve in hydraulic line to lift cylinder. If drifting exceeds five inches in ten minutes, tighten packing glands. If this does not correct the drifting, replace the "V" packing.

Section VI. HYDRAULIC TILT CYLINDER

4-23. General

The mast and carriage assembly is tilted forward and backward on the mast pivot pins by means of the tilt cylinders. A double acting tilt cylinder connects each side of the mast column to the truck frame. Pressure applied to the front or rear by the tilt cylinder causes the mast and carriage assembly to tilt backward or forward, respectively.

4-24. Removal

Remove the hydraulic tilt cylinders (TM 10-3930-625-12).

4-25. Disassembly

Refer to figure 4-7 and disassemble the tilt cylinder.

KEY to fig. 4-7:

1. Pin, cotter (2)
2. Pin, tilt cylinder (2)
3. Lube fitting (2)
4. Setscrew
5. Plug, brass
6. Clevis
7. Gland
8. O-Ring
9. Ring, backup
10. Nut, bearing
11. Wiper, rod
12. "V" Packing
13. Setscrew
14. Rod, piston
15. O-Ring
16. "T" Seal
17. Piston
18. Housing, cylinder

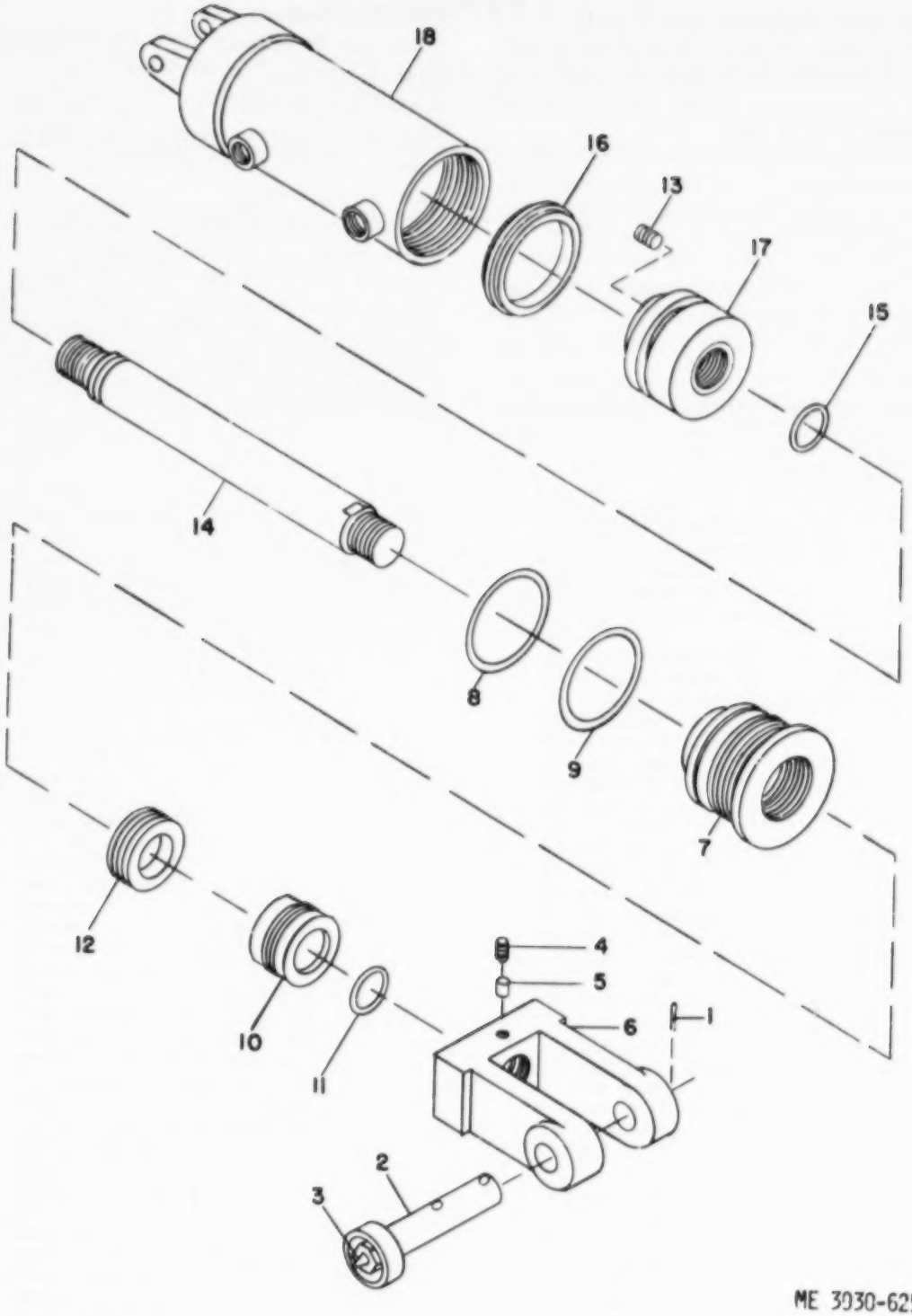


Figure 4-7. Hydraulic Tilt cylinders, disassembly or reassembly.

4-26. Cleaning, Inspection and Repair

a. Cleaning. Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection and Repair.

(1) Inspect piston rod for spots of base metal showing through, and for pitting. Inspect wiper rings for deterioration. Inspect all parts for breaks, cracks, dents, defective seals or other defects.

(2) Replace piston rod if base metal is visible. Replace or rework piston rods if marks or pittings are deeper than 0.015 inch. Replace wiper rings if deteriorated. Replace defective seals.

4-27. Reassembly

Refer to figure 4-7 and reassemble the tilt cylinder.

4-28. Installation

Install the tilt cylinder (TM 10-3930-625-12).

4-29. Drift Test

Install shut-off valve in hydraulic line to tilt cylinder. If drifting exceeds 2⅜ inches in ten minutes, replace piston packing.

4-30. Adjustment

a. Adjust clevis (6, fig. 4-7) as necessary to attain a 3 degree forward tilt in the mast and 10 degrees rearward tilt in the full rearward position.

b. If excessive twisting is evident at the full forward or rearward positions, adjust the rod clevis as necessary for correction of the excessive twisting.

c. Install the tilt cylinder pivot pin (2) and cotter pin (1) and tighten setscrew (4).

CHAPTER 5

REPAIR OF DRIVE AXLE-WHEEL, FINAL DRIVE AND DIFFERENTIAL ASSEMBLIES

Section I. DRIVE AXLE-WHEEL AND FINAL DRIVE ASSEMBLY

5-1. General

The drive axle-wheel and final drive assembly contains the drums, wheel brakes, lining, tires and wheel cylinders. This section provides information useful in the maintenance and repair of the drive axle and wheel.

5-2. Removal

Remove the drive axle-wheel and final drive assembly (para 2-20).

5-3. Disassembly

Refer to figure 5-1 and disassemble the drive axle-wheel and final drive assembly.

KEY to fig. 5-1:

1. Screw, hex-hd (2)
2. Washer, flat (2)
3. Lockwasher (2)
4. Strap, grounding (2)
5. Screw, hex-hd (4)
6. Lockwasher (4)
7. Block, lower (2)
8. Nut (24)
9. Lockwasher (24)
10. Dowel (12)
11. Drum, brake & wheel (2)
12. Tire, solid (2)
13. Plug (2)
14. Plug (2)
15. Spring, extension (2)
16. Rod, anti-rattle (4)
17. Retainer (8)
18. Spring (4)
19. Retainer
20. Washer, flat (4)
21. Shoe and lining assembly, brake (4)
22. Spring, retaining (2)
23. Tube assembly, brake actuating (2)
24. Tube assembly, brake bleeder, LH
25. Tube assembly, brake bleeder, RH
26. Adapter, brake bleeder screw (2)
27. Elbow brake line fitting (6)
28. Adapter, brake cylinder (2) reqd)
29. Gasket, hydraulic inlet adapter (2)
30. Fitting, brake line
31. Elbow
32. Fitting, brake line
33. Nut, jam (4)
34. Lockwasher (4)
35. Screw, cap, brake line fitting (4)
36. Elbow, brake line fitting
37. Fitting, bleeder screw
38. Fitting, bleeder screw
39. Screw, bleeder (2)
40. Nut, jam (ref item 26)
41. Washer (ref item 27)
42. Screw, cap (ref item 28)
43. Screw, cap, brake cylinder (6)
44. Lockwasher (6)
45. Spacer, brake cyl (2)
46. Cylinder assembly, brake, RH
47. Cylinder assembly, brake, LH
48. Rod, push, brake cylinder (4)
49. Nut, hex (16)
50. Lockwasher (16)
51. Plate, backing (2)
52. Dowel (4)
53. Cam, adjustable (4)
54. Spring, extension (4)
55. Bolt, special, cam adjusting (4)
56. Screw, cap (24)
57. Lockwasher (24)
58. Case, gear (2)
59. Stud (12)
60. Stud (4)
61. Gasket (2)
62. Seal, oil (2)
63. Cap, wheel (2)
64. Pin, cotter (2)
65. Nut, special (2)
66. Washer (2)
67. Gear, fd, internal (2)
68. Cone, outer (2)
69. Cup, outer (2)
70. Cone, inner (2)
71. Cup, inner (2)
72. Stud, brake drum and gear drive (24)
73. Nut, spindle to axle housing (6)
74. Nut, spindle to housing (2)
75. Lockwasher (5)
76. Bolt (6)
77. Bolt (2)
78. Spindle, wheel (2)
79. Shaft, axle (2)
80. Nut (16)
81. Lockwasher, axle to final drive housing (8)
82. Lockwasher (8)
83. Dowel (8)
84. Stud (16)
85. Gasket (7)
86. Gasket (11)
87. Bearing (2)
88. Collar (2)
89. Cone (2)
90. Cup (2)
91. Housing, axle, RH
    Housing, axle, LH

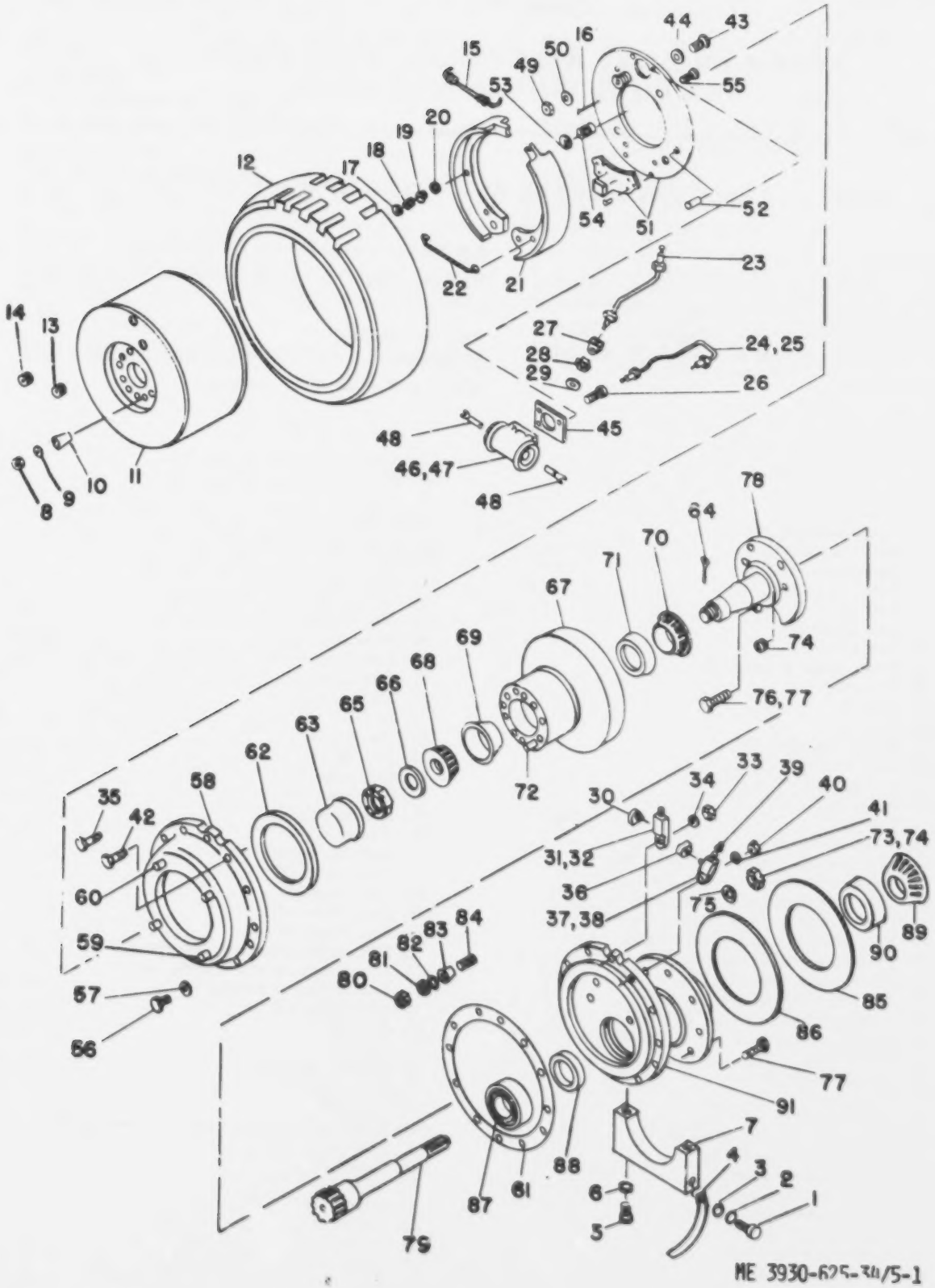


Figure 5-1. Drive axle and wheel assembly, disassembly or reassembly.

5-4. Cleaning, Inspection, Repair and Overhaul

a. Cleaning. Wipe the brake shoe with a clean, dry cloth. Clean all other parts with cleaning fluid (Federal Specification P-D-680).

b. Inspection and Repair.

(1) Inspect the housing for bends, twists, cracks, breaks or other damage that would affect its serviceability. Replace a defective housing.

(2) Inspect all machined surfaces for damage that could result in oil leakage or malfunctioning of parts. Repair or replace defective parts.

(3) Inspect splines for stripped, chipped or burred condition. Replace parts with any such defects.

(4) Inspect threaded openings for damaged threads. Chase damaged threads with the correct size tap.

(5) Replace tapered roller bearings if races show excessive pitting.

(6) Replace wheel spindles if out-of-straightness exceeds 1 / 16 inch.

(7) Replace all oil seals.

NOTE

For brake shoe and wheel cylinder inspection, repair and adjustment refer to paragraphs 7-10 and 7-11. For tire inspection and replacement, refer to paragraph 2-13.

5-5. Reassembly

Refer to figure 5-1 and reassemble the drive axle-wheel and final drive assembly.

5-6. Installation

Install the drive axle-wheel and final drive assembly (para 2-20).

Section II. DIFFERENTIAL DRIVE ASSEMBLY

5-7. General

The differential drive assembly translates power from the drive motor to the drive axles and final drive assemblies.

5-8. Removal

Remove the differential drive assembly (para 2-21).

5-9. Disassembly

Refer to figure 5-2 and disassemble the differential drive assembly.

KEY to fig. 5-2:

1. Plug, drain
2. Pin, cotter
3. Nut, hex, slotted
4. Coupling, half
5. Screw, cap (6)
6. Lockwasher (6)
7. Retainer, oil seal
8. Seal, oil
9. Cover (2)
10. Gasket (3)
11. Washer
12. Bearing
13. Shim (0.003 and 0.005) (2)
14. Ring, snap (2)
15. Pinion, bevel
16. Screw, cap (7)
17. Lockwasher (7)
18. Screw, cap, hex (2)
19. Lockwasher (2)
20. Nut, hex (2)
21. Gasket (2)
22. Gasket (3)
23. Rivet (2)
24. Retainer
25. Ring, lock
26. Bearing
27. Race, bearing
28. Cage
29. Wire, lock
30. Screw, cap, hex (8)
31. Case, differential, plain half
32. Case, differential, flanged half
33. Rivet (12)
34. Gear, bevel
35. Gear, bevel (2)
36. Washer, thrust (2)
37. Washer, thrust (4)
38. Pinion, differential (4)
39. Spider, differential
40. Screw, machine
41. Seal, copper
42. Plug (2)
43. Housing, final drive

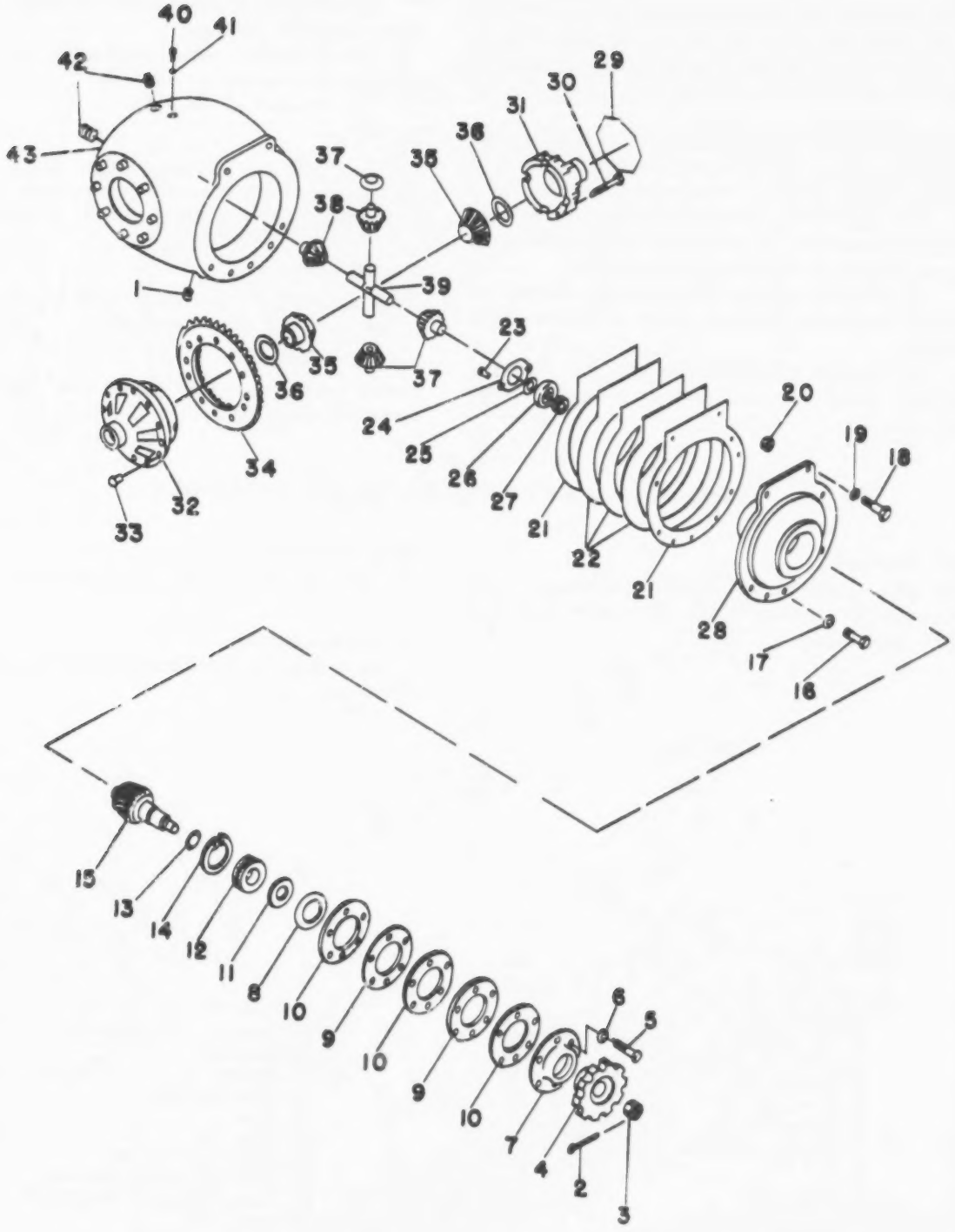


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Figure 5-2. Differential assembly, disassembly or reassembly.

5-10. Cleaning, Inspection, Repair and Overhaul.

a. Cleaning. Wash all parts in cleaning solution (Federal Specification P-D-680) and dry thoroughly.

b. Inspection, Repair and Overhaul.

(1) Inspect bearings for roughness of rotation. Replace a bearing if its rotation is still rough after cleaning and oiling.

(2) Inspect bearings for scored, pitted, scratched, cracked or chipped races, and for indication of excessive wear of rollers. If any one of these defects is found, replace the bearing.

(3) Inspect housing mounting faces for burrs, scratches, and nicks. If damaged, repair or replace the housing.

(4) Inspect gears for scuffed, nicked, burred or broken teeth. If defects cannot be removed with a soft stone, replace the gear.

(5) Replace bevel and pinion gears if teeth are broken or backlash exceeds 0.030 in. Normal backlash is 0.006 in. to 0.010 in.

(6) Inspect thrust washers for [illegible], scores, burrs and wear. Replace the thrust washers if they are defective or worn.

5-11. Reassembly

Refer to figure 5-2 and reassemble the differential drive assembly.

5-12. Installation

Install the differential drive assembly [illegible]

CHAPTER 6

REPAIR OF STEERING ASSEMBLY

Section I. STEERING GEAR ASSEMBLY

6-1. General

A manually operated steering system is used on the forklift truck. Steering is effected through the two rear wheels which are controlled by the hand steering wheel by means of mechanical linkage. The steering gear assembly includes the steering wheel and column, the sector gear, pitman arm and drag link.

6-2. Removal

Remove the steering gear (para 2-14).

CAUTION

Before disassembling the worm and gear inside the steering gear box, mark both for their relative position. Also mark Pitman arm and its relative position to gear shaft.

6-3. Disassembly

Refer to figure 6-1 and disassemble the steering gear.

KEY to fig. 6-1:

1. Screw, machine (4)
2. Button, horn assembly
3. Button, horn
4. Diaphragm, horn button
5. Cushion, rubber
6. Plate, contacting
7. Nut, retaining, steer wheel
8. Key, woodruff
9. Wheel, steering
10. Spring, helical
11. Seat, spring
12. Bearing assembly
13. Nut, steering column, jacket clamp
14. Lockwasher
15. Screw, machine
16. Clamp
17. Nut, plain, hex (2)
18. Lockwasher (2)
19. U-Bolt
20. Jacket, steering column
21. Screw, machine (4)
22. Cover
23. Screw, machine (4)
24. Connector assy (2)
25. Nut, lock
26. Housing, bearing
27. Bearing, tapered
28. Shaft assembly
29. Nut, ball
30. Screw, machine (2)
31. Lockwasher (2)
32. Clamp
33. Tube, retainer (2)
34. Ball (106)
35. Bearing, tapered
36. Plate, end
37. Pin, cotter (2)
38. Nut, hex, slotted (2)
39. Pin, roller (2)
40. Ball, joint (2)
41. Fitting, lub (2)
42. Nut, jam (2)
43. Drag link
44. Nut, hex, locking
45. Lockwasher
46. Arm, pitman
47. Seal
48. Bushing, bronze
49. Screw, special (3)
50. Nut, adjusting
51. Cover, assembly
52. Bushing, bronze
53. Gasket, housing
54. Shim
55. Screw, adjusting
56. Gear sector
57. Plug, filler
58. Screw, machine (3)
59. Lockwasher (3)
60. Housing

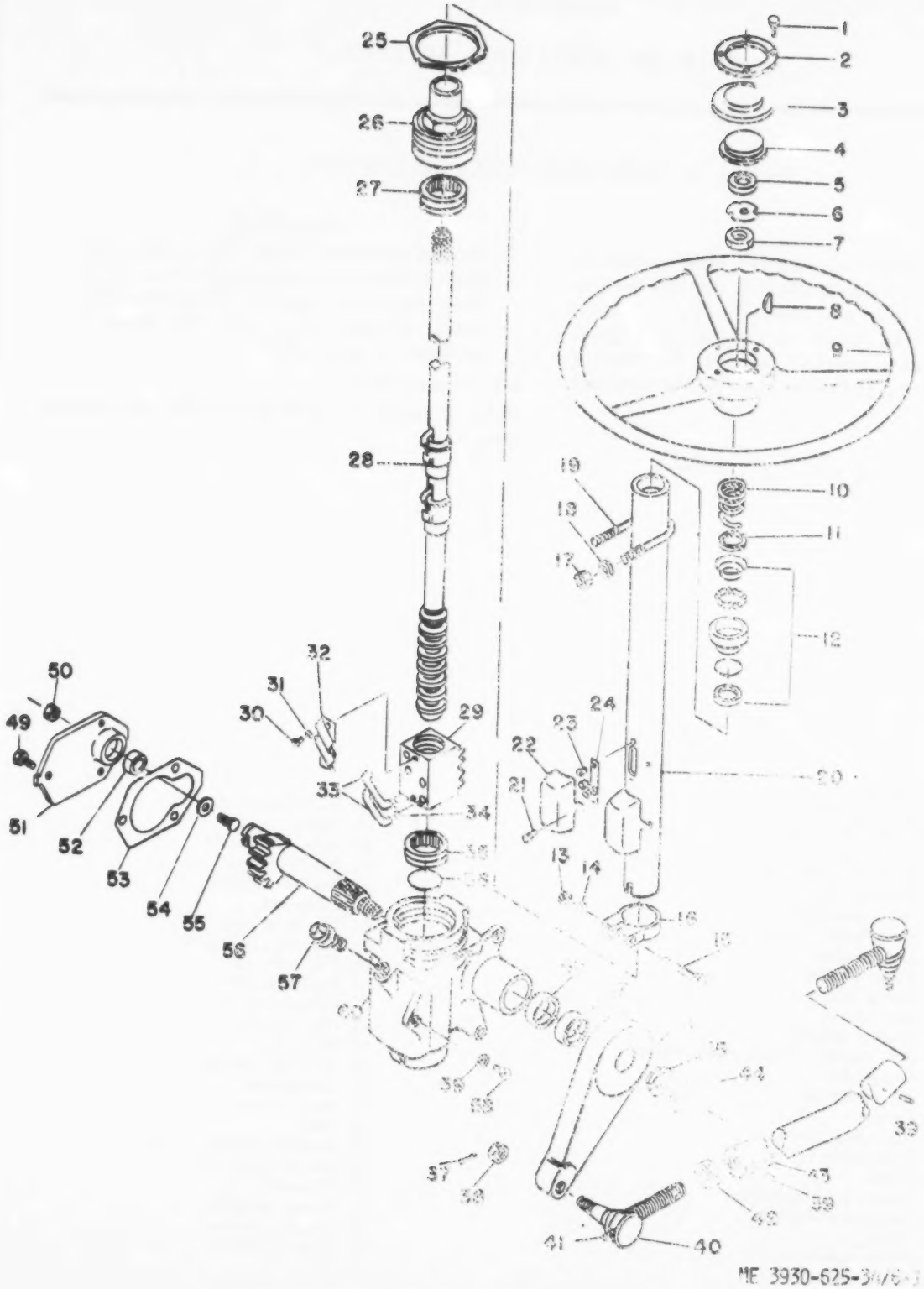

Figure 6-1. Steering gear assembly, disassembly or reassembly.

6-4. Cleaning, Inspection and Repair

a. Cleaning. Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection and Repair.

(1) Inspect the worm and sector gears for chipped, scored or brinnelled areas. Inspect splines for chipped or burred condition. Replace any defective parts.

(2) Inspect threads for damage. Replace defecti.e parts.

(3) Inspect the housing for cracks or breaks. Repair or replace a defective housing.

(4) Inspect all parts for damage and wear. Replace damaged parts.

6-5. Reassembly

CAUTION

When installing the worm and shaft, ensure that their relative position is in accordance with marks made during disassembly. Be sure the sector gear and the pitman arm are centered so that the left and right steering motions are equal (refer to para 2-14). In addition, see that the gears mesh properly.

Refer to figure 6-1 and reassemble the steering gear assembly.

6-6. Installation

Install the steering gear assembly (para 2-14).

6-7. Adjustment

a. The total play in the steering gear assembly should be not less than that indicated by a two-inch total movement of the steering wheel. When the total free movement of the steering wheel is three inches or more, adjust the play in the steering gear assembly so that the steering wheel has a total free movement of two inches.

b. Adjust the play in the steering gear assembly by loosening the locknut (50, fig. 6-1) and, with a screw driver, adjust the position of the sector gear, by turning the adjusting screw (55). After setting the adjusting screw, lock it by tightening the nut (50).

Section II. STEERING AXLE ASSEMBLY

6-8. General

The steering axle assembly includes the weldment, the steering axle (rear axle) and steering wheels, king pins, bearings, tie rods etc. The steering mechanism is operated by mechanical linkage (drag link) to the steering gear.

6-9. Removal

Remove the steering axle assembly (para 2-16).

CAUTION

Before disassembling the bellcrank assembly housing (36, fig. 6-2), mark housing and axle weldment to ensure alignment of bolt holes during reassembly.

6-10. Disassembly

Refer to figure 6-2 and disassemble the steering axle assembly.

KEY to fig. 6-2:

1. Nut, jam, hex (8)
2. Screw, socket hd (4)
3. Block support (2)
4. Washer, thrust (5)
5. Fitting, lube (2)
6. Bushing (2)
7. Tire, sld rub (2)
8. Bolt, wheel (12)
9. Wheel (2) reqd)
10. Screw, machine, fl hd (8) reqd)
11. Cover, hub (2)
12. Pin, cotter (2)
13. Nut, slotted, hex (2)
14. Washer, flat (2)
15. Bearing, cone, roller (2)
16. Cup, bearing, outer (2)
17. Hub (2)
18. Cup, bearing, inner (2)
19. Bearing, cone, roller inner (2)
20. Seal (2)
21. Setscrew, cup pt (2)
22. Bearing, needle (4)
23. Pin, king (2)
24. Bearing, thrust (2)
25. Washer (2)
26. Spindle, R.H.
27. Spindle, L.H.
28. Pin, cotter (4)
29. Nut, slotted, hex (4)
30. Tie rod assembly (2)
31. Fitting, lube (4)
32. Ball and socket assembly (4)
33. Nut, jam, hex (4)
34. Tie rod (2)
35. Screw, cap, hex-hd (6)
36. Bell crank assembly
37. Key, square
38. Lever arm
39. Bell crank
40. Bearing, sleeve (2)
41. Bearing housing
42. Fitting, lube
43. Axle, articulating

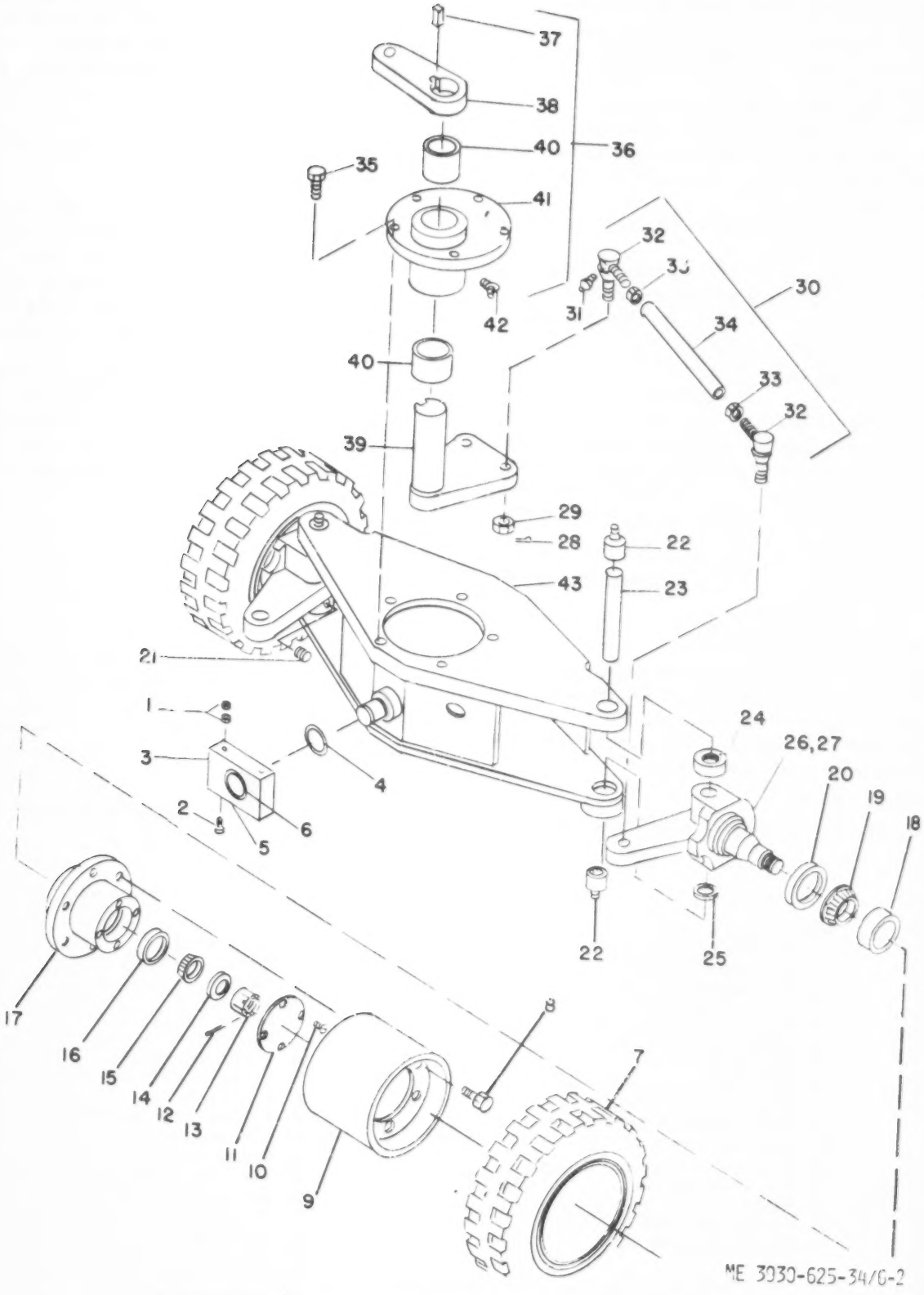

Figure 6-2. Steering axle assembly, disassembly or reassembly.

6-11. Cleaning, Inspection, Repair and Overhaul

a. Cleaning. Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection, Repair and Overhaul.

(1) Inspect all parts for breaks, cracks, loose or missing hardware, or other defects. Tighten or replace loose or missing hardware.

(2) Inspect tires and replace if rubber is worn to approximately 12 inch diameter.

(3) Replace tapered roller wheel bearings if excessive pitting of races is evident.

(4) Inspect bell crank housing for defects or damage.

(5) Replace king pin needle bearings if king pin has been removed. Replace spindles if out-of-straightness exceeds 1 / 16 inch.

(6) Replace oil seals.

(7) Check for bent pivot pins and for pivot pin radial wear. Maximum out-of-straightness 1 / 16 inch and maximum radial wear 0.050 inch (nominal diameter 1.499 inch).

(8) Check pivot bushings for wear. Maximum radial wear 0.050 inch (nominal diameter 1.500 inch).

(9) Check pivot shims for wear. Maximum axial clearance 3 / 32 inch. Shim if necessary.

NOTE

Check to ensure that shear blocks are welded to the face of the front pivot block.

6-12. Reassembly

Refer to figure 6-2 and reassemble the steering axle assembly.

6-13. Installation

Install the steering axle assembly (para 2-16).

6-14. Adjustments

a. Drag Link.

(1) The drag link (43, fig. 6-1) and ball joints (40) are adjusted by the manufacturer, and are locked in adjustment by a roll pin (39). Proper adjustment of length permits linkage of the drag link assembly to the pitman and steering arms when both arms are in the mid-travel positions and the rear wheels are parallel to the center line of the truck.

(2) Should a replacement drag link assembly require adjustment, remove the roll pins (39), and loosen the jam nuts (42). Turn the ball joints in the proper direction to lengthen or shorten the effective length of the drag link (43). An approximate equal number of thread should be visible on each ball joint. After the adjustment is made, tighten the jam nuts (42). A new locating hole can now be drilled in the ball joint stud and roll pins installed to lock the drag link assembly in proper adjustment.

b. Tie Rods. Remove the cotter pins (28, fig. 6-2) and nuts (29) which secure the tie rod assemblies (30) to the bell crank (39) and spindles (26 and 27). Position the rear wheels parallel to the truck center line, and the steering arm perpendicular to the center line. Loosen the jam nuts (33) and turn the ball joints (32) on each tie rod (34) to lengthen or shorten the tie rods to the desired amount to effectively link the bell crank to the spindles. An approximate equal number of threads should be visible on each tie rod. Tighten the jam nuts and reassemble tie rods.

CHAPTER 7

REPAIR OF BRAKES

Section I. DRIVE MOTOR COUPLING AND SEAT BRAKE ASSEMBLY

7-1. General

The seat brake is a mechanically operated brake system which locks the drive motor shaft when the seat is unoccupied. The brake shoes and drum components operate within the motor support and coupling housing. Brake application is made through a spring actuated linkage to the seat.

7-2. Removal

a. Coupling and Brake Assembly. Remove the drive motor support, coupling and seat brake assembly (para 2-19).

b. Seat Brake Shoes and Drum.

(1) Lift the two return springs (1, fig. 7-1) and the two side springs (2) from the brake shoes (3), and lift off the brake shoes from the brake backing plate (4).

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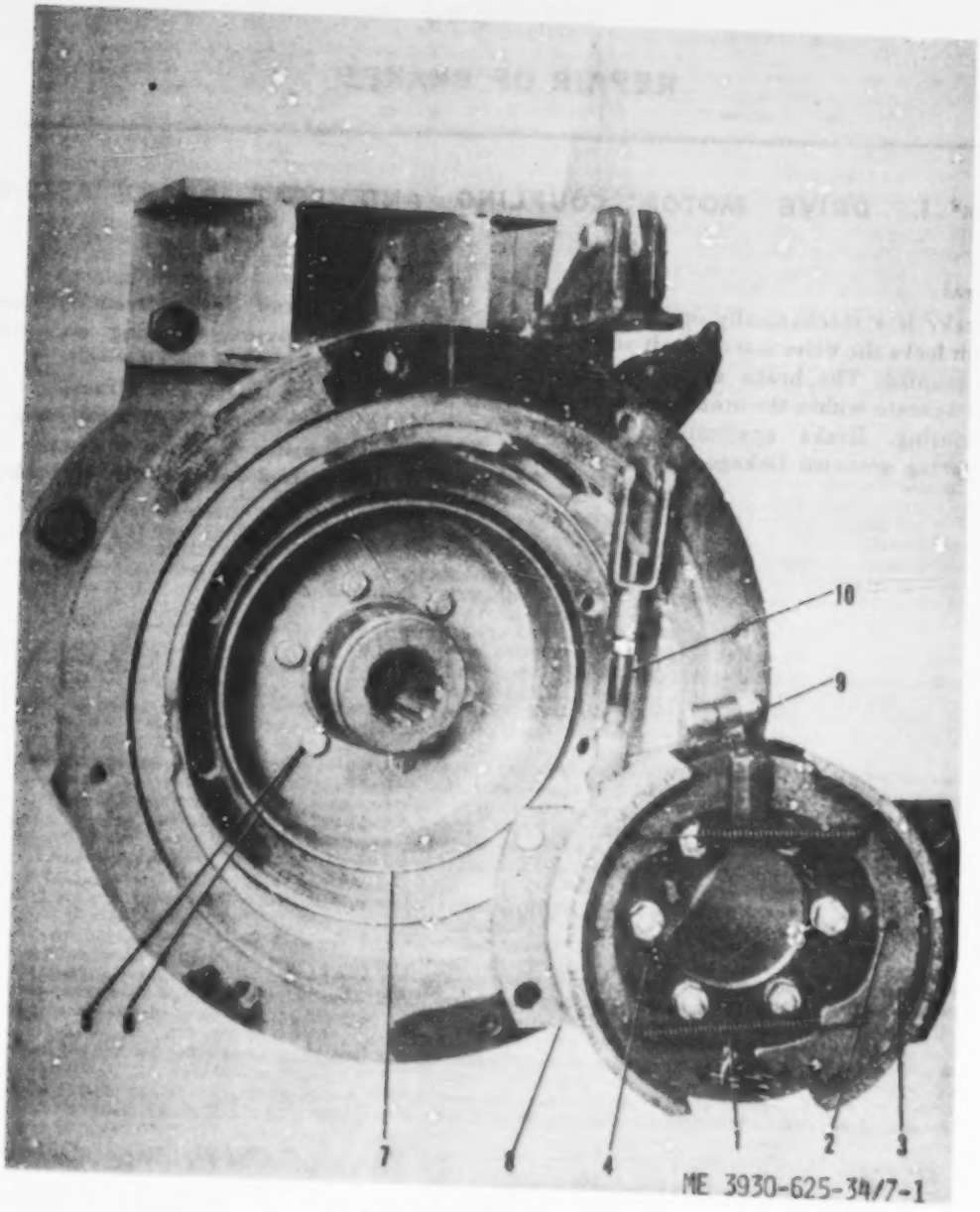


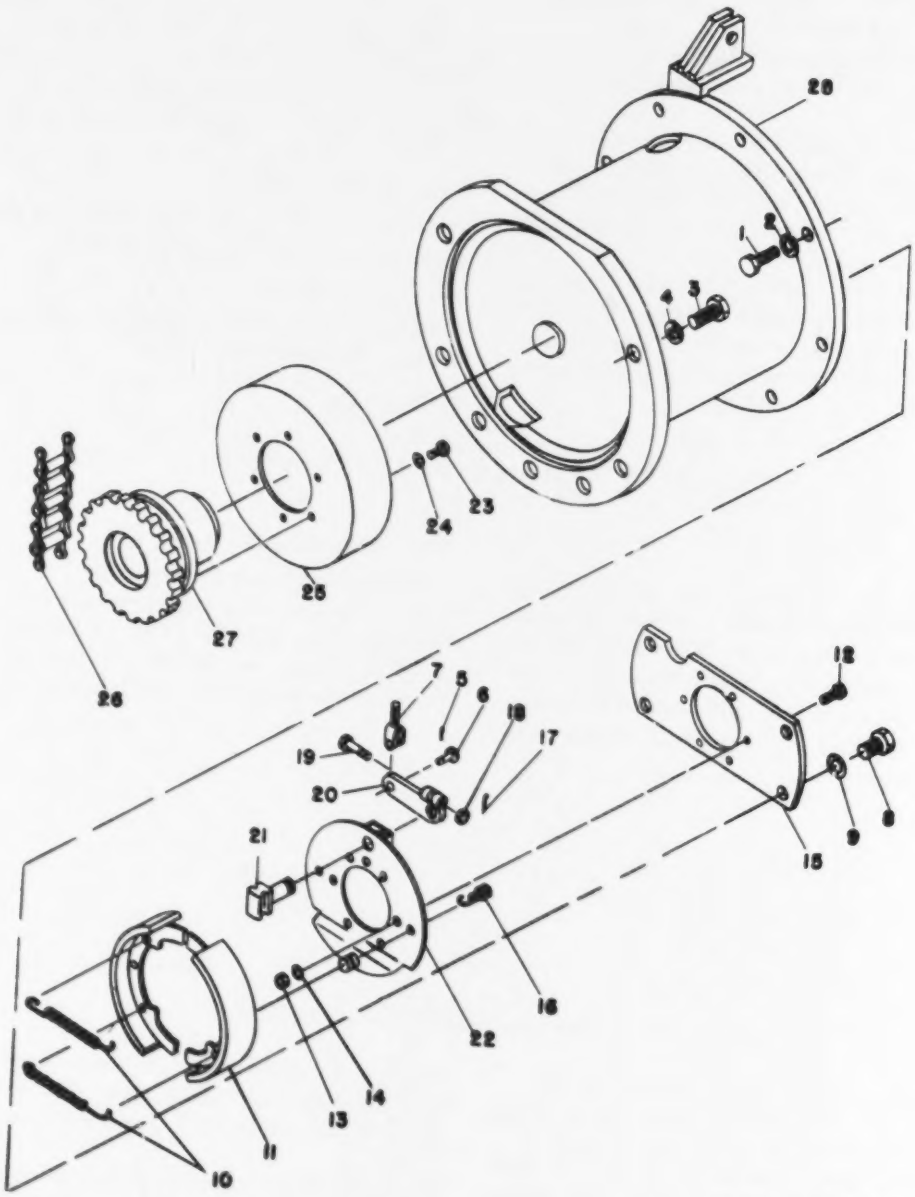
1. Return spring (2)
2. Side spring (2)
3. Brake shoes (2)
4. Brake backing plate
5. Cap screw (6)
6. Nut (6)
7. Brake drum
8. Brake mounting bracket
9. Brake lever
10. Brake actuating rod

Figure 7-1. Seat brake assembly, removal or installation.

(2) Remove six capscrews (5) and nuts (6) and lift away the brake drum (7).

7-3. Disassembly

Refer to figure 7-2 and disassemble the drive motor coupling and seat brake assembly.



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1. Screw, cap, hex-hd (8)
2. Lockwasher (8)
3. Capscrew (7)
4. Lockwasher (7)
5. Pin, cotter
6. Pin, headed
7. Brake actuating rod
8. Bolt, machine (4)
9. Lockwasher (4)
10. Spring, ext (4)
11. Shoe, brake (2)
12. Screw, machine, hex-hd (6)
13. Nut, hex (6)
14. Lockwasher (6)
15. Bracket, mounting
16. Spring (4)
17. Pin, cotter
18. Nut, slotted hex
19. Bolt, hex-hd
20. Lever, brake control
21. Cam
22. Back plate assembly
23. Screw, machine, hex-hd (6)
24. Lockwasher (6)
25. Drum, brake
26. Chain
27. Coupling, driving half
28. Support, motor

Figure 7-2. Drive motor support coupling and seat brake assembly, disassembly or reassembly.

7-4. Cleaning, Inspection and Repair

a. Cleaning. Wipe the brake shoe with a clean dry cloth. Clean all other parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

b. Inspection and Repair.

(1) *Motor support.* Inspect the motor support for cracks, dents or other damage. Repair or replace if defective.

(2) *Coupling.* Inspect coupling sprocket for broken or damaged teeth. Replace if defective. Inspect coupling chain for cracked plates or worn pins. If defective, replace complete coupling chain.

(3) *Brake assembly.*

(a) Brake drum. Inspect the brake drum for cracks, scoring or other damage. Replace or repair drum if scored or rough. If brake drum is machined in a lathe, remove only enough material to render drum serviceable.

(b) Brake shoes. Inspect brake lining for glaze, for evidence of grease or oil, wear, and loose rivets. Replace brake shoes if lining is oil or grease soaked, or if worn to a thickness of less than ⅛ inch.

(c) Attaching parts. Inspect the springs for cracks, distortion, or loss of tension. Replace defective springs. Inspect the brake shoes, lever, mounting bracket and back plate for wear or damage. Repair or replace as necessary.

7-5. Reassembly

Refer to figure 7-2 and reassemble the drive motor coupling and seat brake assembly.

7-6. Installation

Install the drive motor support, coupling and seat brake assembly (para 2-19).

Section II. SERVICE BRAKE SYSTEM

7-7. General

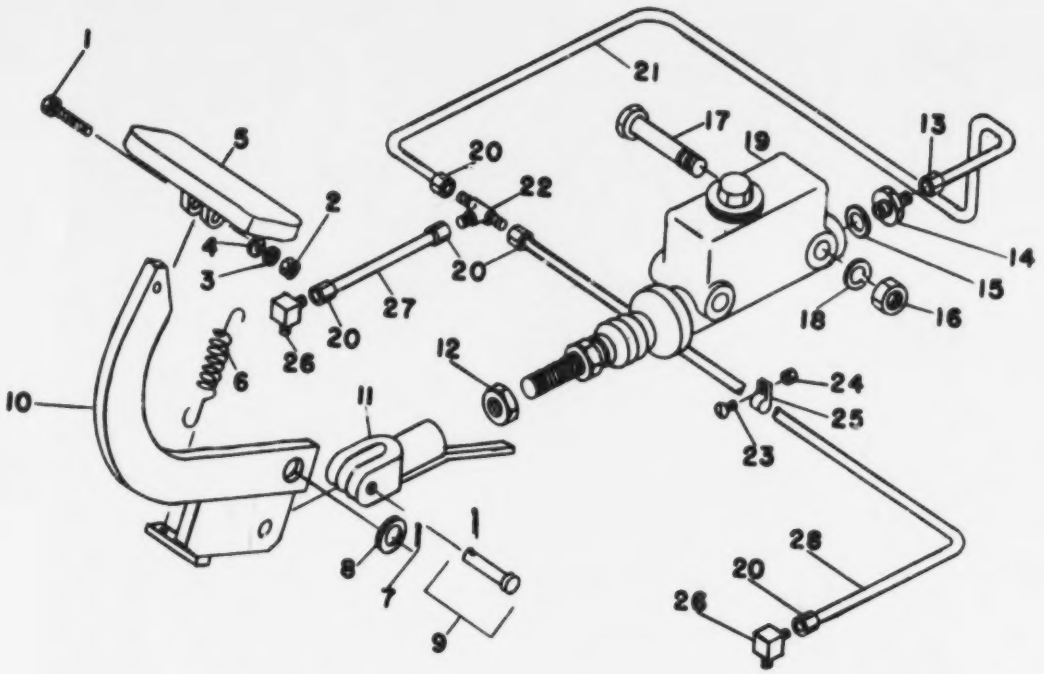
The hydraulic brake system is operated by depressing the foot brake pedal which is linked to the hydraulic master cylinder. Movement of the master cylinder piston distributes hydraulic fluid under pressure to the wheel cylinders of the drive wheels. Only the two drive (front) wheels are equipped with brakes

7-8. Brake Pedal Assembly

a. Removal and Disassembly

(1) Remove the front and rear floor plates and brake master cylinder (TM 10-3930-625-12).

(2) Refer to figure 7-3 and remove and disassemble the brake pedal and linkage.



ME 3930-625-34/7-3

1. Bolt, hex-hd
2. Nut, hex
3. Lockwasher (2)
4. Washer, flat (4)
5. Pedal, brake
6. Spring, extension
7. Pin, cotter (2)
8. Washer, flat (2)
9. Pin, yoke assembly
10. Arm assembly, brake
11. Yoke
12. Nut, jam
13. Nut, tube
14. Adapter, straight
15. Gasket
16. Nut, hex (2)
17. Bolt, hex-hd (2)
18. Lockwasher (2)
19. Cylinder, hydraulic brake
20. Nut, tube (5)
21. Tube
22. Tee, union
23. Screw, machine
24. Nut, hex
25. Clip, retaining, tube
26. Elbow, male (2)
27. Tube
28. Tube

Figure 7-3. Brake pedal and linkage assembly, disassembly or reassembly.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

(2) Inspect for breaks, cracks, bends, loose or missing hardware, or other defects. Tighten or replace loose or missing hardware. Replace damaged or defective parts as necessary.

(3) Inspect spring for distortion or loss of tension. Replace spring if defective.

c. Reassembly and Installation.

(1) Refer to figure 7-3 and reassemble and install the brake pedal and linkage assembly.

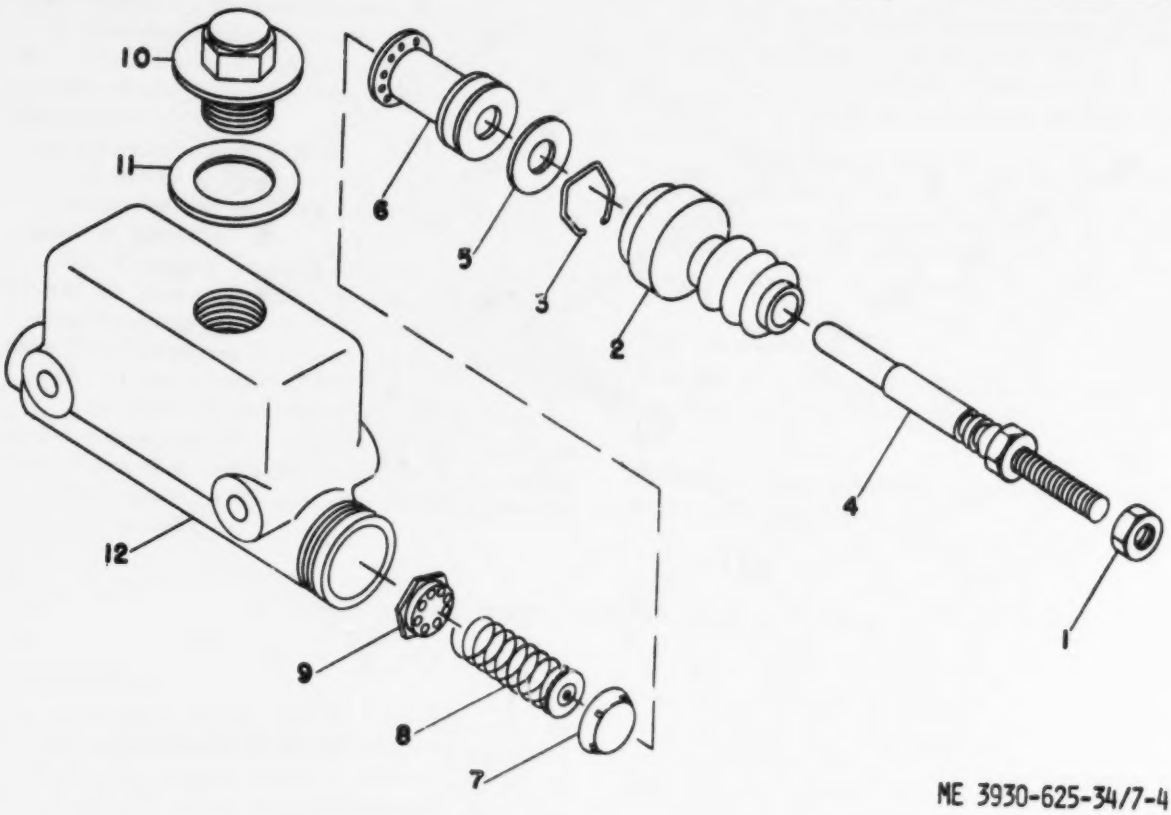
(2) Install the brake master cylinder and floor plates (TM 10-3930-625-12).

d. Adjustment of the Brake Pedal and Linkage. With foot pedal in fully upward position, adjust piston rod clevis in such a way that a slight free travel (approx. 1 / 16 inch) of the rod is possible without any movement of the piston itself (observe piston travel through filler hole).

7-9. Master Brake Cylinder

a. Removal. Remove the master brake cylinder (TM 10-3930-625-12).

b. Disassembly. Refer to figure 7-4 and disassemble the master cylinder.



1. Nut, plain, hex
2. Boot, master cylinder
3. Ring, lock
4. Rod
5. Plate, stop
6. Piston assembly
7. Cup, rubber
8. Spring, helical, compression
9. Valve, check
10. Cover
11. Gasket, cover
12. Housing, cylinder

Figure 7-4. Hydraulic brake master cylinder, disassembly or reassembly.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with cleaning solvent (Federal Specification P-D-680) and dry thoroughly.

(2) Inspect for deteriorated cups or cuts in lip of cups. Replace if defective.

(3) Inspect the piston for wear, pitting or corrosion. Replace if defective.

(4) Inspect cylinder for cracks and damage. Replace if defective.

(5) Inspect spring for distortion or loss of tension. Replace defective spring.

d. Reassembly. Refer to figure 7-4 and reassemble the master brake cylinder.

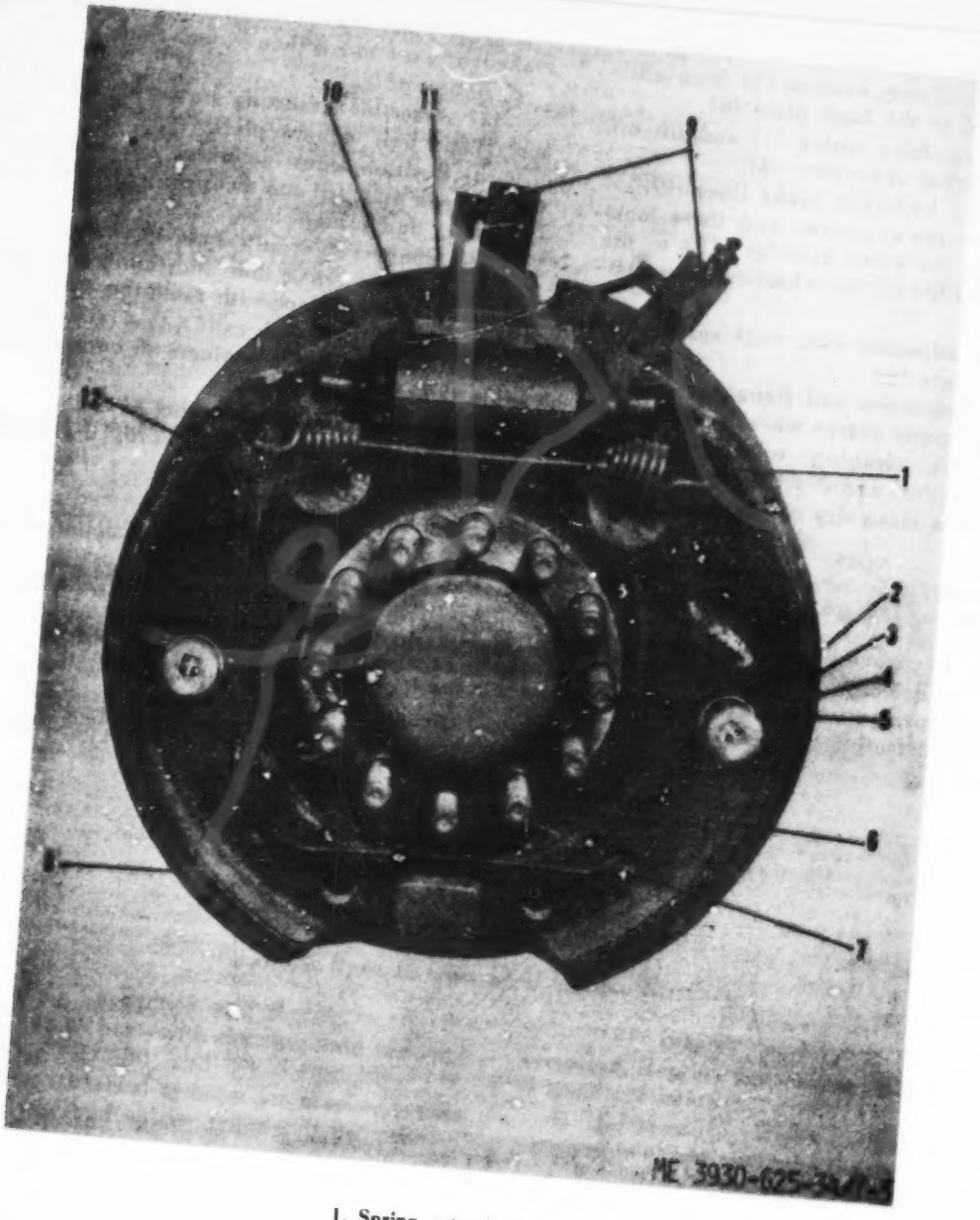
e. Installation. Install the master brake cylinder (TM 10-3930-625-12).

7-10. Drive Wheel Brakes

a. Removal and Disassembly.

(1) Remove the drive wheels (TM 10-3930-625-12).

(2) Remove the return spring (1, fig. 7-5).



1. Spring, return (2)
2. Retainer (8)
3. Spring (4)
4. Retainer (ref item 2)
5. Washer (as reqd, approx 4)
6. Plate back (2)
7. Spring, retaining (2)
8. Brake shoe & lining assy (4)
9. Hydraulic brake lines
10. Wheel cylinder (2)
11. Spacer (2)
12. Adjusting cam

Figure 7-5. Service brake assembly, removal or installation.

(3) Remove two retainers (2), two springs (3), two retainers (4) and two washers (5) from anti-rattle rod attached to the back plate (6).

(4) Remove retaining spring (7) and lift off brake shoe and lining assemblies (8).

(5) Disconnect hydraulic brake lines (9).

(6) Remove three capscrews and three lockwashers attaching the wheel cylinder (10) to the back plate (6) and lift off the wheel cylinder (10) and spacer(11).

(7) Remove adjusting cam (12) spring and bolt from back plate (6).

b. Cleaning, Inspection and Repair.

(1) Clean all parts except wheel cylinder and brake shoes with cleaning solvent (Federal Specification P-D-680) and dry thoroughly. Wipe brake shoes with a clean dry cloth.

NOTE

For disassembly, inspection and repair of wheel cylinder, refer to paragraph 7-11.

(2) Inspect all parts for breaks, cracks or other damage. Replace defective parts.

(3) Inspect springs for distortion or loss of tension. Replace defective springs.

(4) Replace brake shoes if lining is oil or grease soaked, or worn to less than ⅛ inch thick.

c. Reassembly.

(1) Assemble adjusting cam (12, fig. 7-5), spring and bolt to back plate (6).

(2) Position wheel cylinder (10) and spacer (11) to back plate (6) and secure in place with three capscrews and lockwashers.

(3) Connect hydraulic lines (9).

(4) Position brake shoe and lining assemblies (8) and secure in place with retaining spring (7).

(5) Install two washers (5), two retainers (4), two springs (3) and two retainers on anti-rattle rod attached to the back plate.

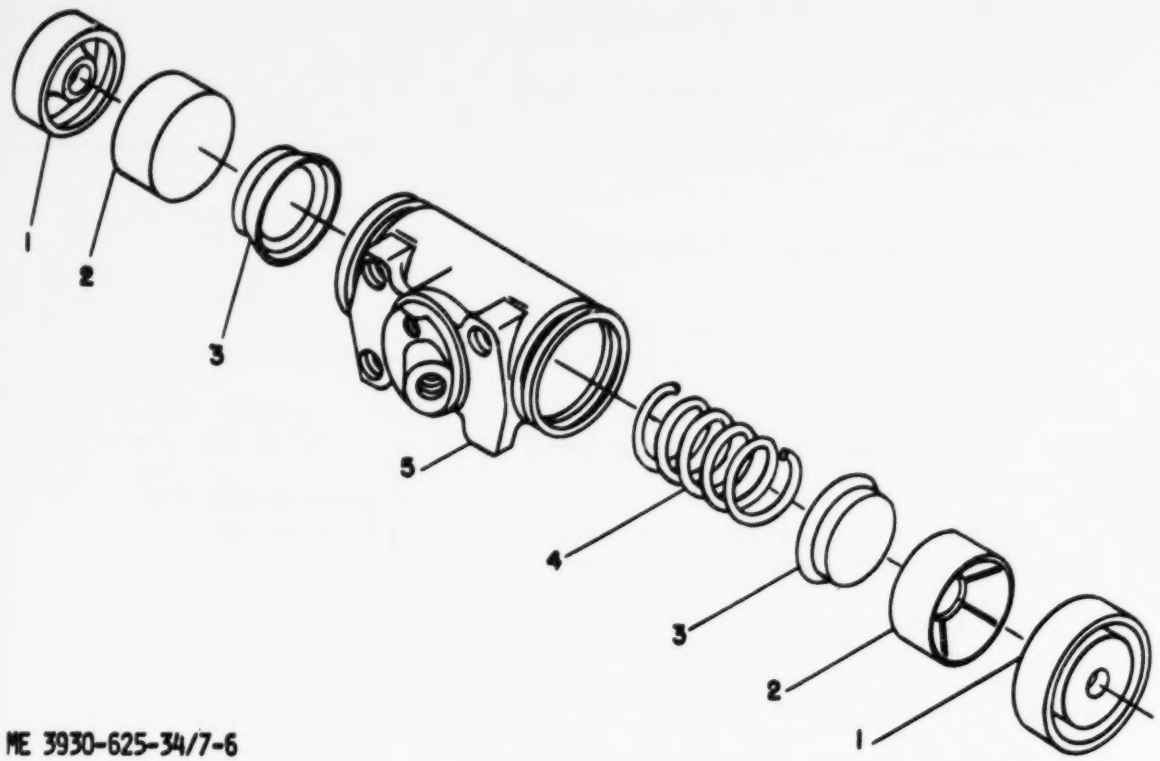
(6) Install the return spring (1).

(7) Install the drive wheels (TM 10-3930-625-12).

7-11. Wheel Cylinder

a. Removal. Remove the wheel cylinder (para 7-10).

b. Disassembly. Refer to figure 7-6 and disassemble the wheel cylinder.



ME 3930-625-34/7-6

1. Boot (2)
2. Piston (2)
3. Cup (2)
4. Spring, helical, comp (2)
5. Housing, RH
   Housing, LH

Figure 7-6. Hydraulic brake wheel cylinder, disassembly.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with cleaning fluid (Federal Specification P-D-680) and dry thoroughly.

(2) Inspect wheel cylinder for cracks, breaks or other damage. Replace cylinder if defective.

(3) Inspect push rods for pitting, or corrosion. Replace cups or piston in wheel cylinder if leaks are evident.

d. Reassembly. Refer to figure 7-6 and reassemble the wheel cylinder.

e. Installation. Install the wheel cylinder (TM 10-3930-625-12).

APPENDIX A

REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers for Army Users

A-2. Lubrication

C9100IL	Fuels Lubricants, Oils and Waxes
LO 10-3930-625-12	Lubrication Order

A-3. Painting

TM 9-213	Painting Instructions for Field Use

A-4. Maintenance

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy use. (Mobility Equipment Command).
TM 5-764	Electric Motor and Generator Repair
TM 38-750	Army Equipment Record Procedures
TM 10-3930-625-20P	Organizational Maintenance Repair Parts
TM 10-3930-625-12	Operator and Organizational Maintenance Manual
TM 10-3930-625-35P	Direct Support, General Support and Depot Maintenance, Repair Parts
TM 9-6140-200-15	Operation and Organizational, Field & Depot Maintenance Storage Batteries, Lead Acid Type.
TM 10-1690A	Industrial Motive Power Storage Batteries for Materials Handling Equipment

A-5. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment

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